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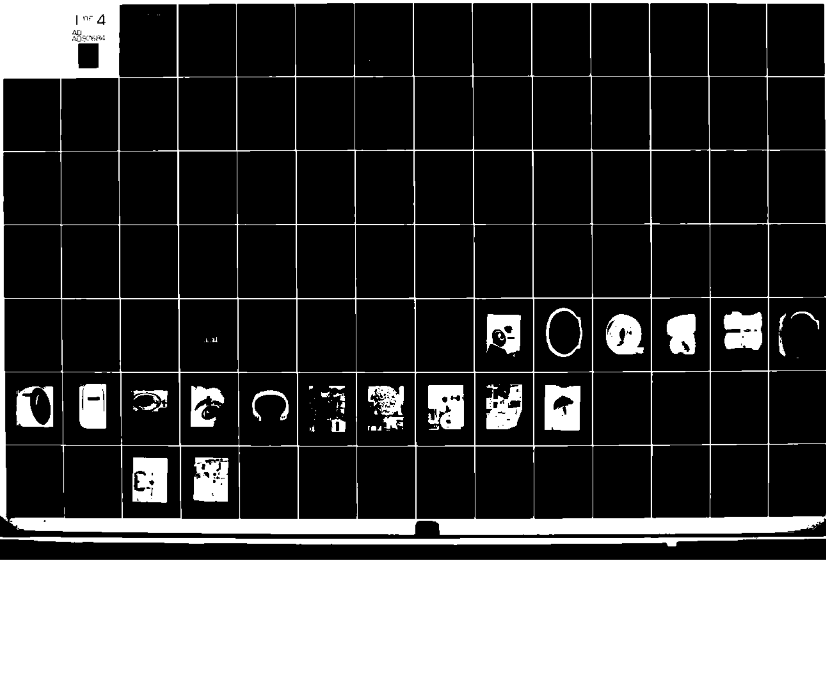

AFWAL-TR-80-3055

LEVEL II

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STATIC AND DYNAMIC EVALUATION OF A-37 CAST AND CAST CARCASS/INTEGRAL TREAD TIRES

Paul C. Ulrich

Mechanical Branch
Vehicle Equipment Division

November 1980

TECHNICAL REPORT AFWAL-TR-80-3055

Final Report for Period September 1977 - September 1979

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This technical report has been reviewed and is approved for publication.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report describes work undertaken during Phases II and III of a three Phase program initiated with Zedron Inc., to establish the potential of cast tires for application to Air Force aircraft. Phases II and III involved static, quasi-static, and dynamic laboratory test and evaluation of 30 cast 7.00-8 Type III aircraft tire designs. These designs included tire carcasses which were rotationally cast/molded from thermoplastic polyester elastomer materials (Hytrels) of various hardness with and without reinforcements. Three basic cast tire designs were developed and evaluated during Phase II efforts; the

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one-piece cast tire, the cast carcass/replaceable tread tire, and the cast carcass/integral tread tire.

The development of the one-piece cast tire was terminated after three design iterations (15 tires) were evaluated due to its shortened dynamic life caused by tread groove failures (areas of high stress concentration).

The development of the two-piece cast carcass/replaceable tread tire was terminated after two design iterations (10 tires) were evaluated primarily due to tread derailment problems. These designs, however, represented a considerable improvement over the one-piece cast tire designs as the tread groove failures (areas of high stress concentration) were eliminated by replacing the thermoplastic material with conventional tire materials in the tire tread.

Twenty-five integral tire design iterations (105 tires), some of which included glass reinforcement, were tested and evaluated to the A-37 aircraft main gear tire specifications. The testing resulted in the following significant achievements:

1. Successfully completed one-hundred A-37 qualification takeoff cycles. Each of these test cycles consisted of a simulated takeoff (excluding the taxi) from 0 mph to a liftoff speed of 150 mph at an initial load of 6650 lbs which decreased linearly to 0 lbs at liftoff.

2. Withstood 91% (400 psig) of the burst test pressure requirements.

3. Successfully completed 2.65 taxi miles (14,000 ft) at a rated load of 6650 lbs and a taxi speed of 30 mph.

4. Successfully completed 1500 continuous miles at a reduced load of 1500 lbs and a taxi speed of 30 mph.

Even though these results are considered significant achievements for a cast thermoplastic, polyester, elastomer tire, they fall far short of the full A-37 main gear tire qualification due to their inability to complete the required taxi rolls at rated (6650 lbs) load without incurring permanent structural damage.

The major shortcomings of the integral tire designs were the thermoplastic, elastomer material's susceptibility to material creep and flex cracking which occurred during the taxi rolls at rated load and at high tire deflection.

The major shortcomings of the rotational cast process were the inability to maintain a uniform wall thickness around the toroidal cross section of the tire causing areas of high stress concentration and localized heating, promoting material creep during dynamic testing, and the inability to obtain a proper material cure from tire to tire (poor repeatability) causing material degradation and a loss of material mechanical properties in some of the tires.

FOREWORD

This report describes an in-house effort conducted by personnel of the Mechanical Branch (FIEM), Vehicle Equipment Division (FIE), Flight Dynamics Laboratory, Air Force Wright Aeronautical Laboratories, Wright-Patterson Air Force Base, Ohio, under project number 2402, "Mechanical Systems for Advanced Military Flight Vehicles," task number 240201, "High Performance Landing Gear for Advanced Military Flight Vehicles," work unit number 24020118, "Tire Ground Performance Criteria." This in-house effort was in support of Phase II and Phase III cast tire development work of contract F33615-76-C-3062. This report covers work performed during the period of September 1977 to September 1979, under the direction of the author, Paul C. Ulrich (AFWAL/FIEM), project engineer. The report was released by the author in March 1980. Previous results, Phase I, of this contract are reported in Technical Report AFFDL-TR-77-51, which was released in July 1977.

The author wishes to acknowledge the various suggestions received during this program from Aivars V. Petersons of the Flight Dynamics Laboratory and Dr. Howell K. Brewer of the Department of Transportation. The author also acknowledges the assistance contributed by Ted Dull, University of Cincinnati (co-op) student, R. W. Tatsch and W. Maggard of Systems Research Laboratories.

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SECTION I

INTRODUCTION

1. BACKGROUND

Annually, replacement tires for aircraft ranks as a major logistics cost item in maintaining landing gear systems on US Air Force aircraft and the high rate of tire replacement represents considerable aircraft out-of-service time.

The conventional aircraft tire is an extremely complicated structure made from a variety of rubber, textile, and wire materials which are processed in numerous manufacturing stages and vulcanized into a tire shape. Variations and inconsistencies in manufacture are very difficult to control due to the multi-component assembly and the many hand operations required. Recently, developments in polymer chemistry offer the possibility of casting or molding tires from high strength, high molecular weight polymers utilizing automated systems. A comparison of a single component polyester elastomer tire and the multi-component conventional tire is shown in Figure 1. Several major tire companies have cast/molded automotive tires which have passed laboratory and service endurance tests but still require improvements in tread wear and traction. It is anticipated that if a cast carcass/replaceable tread aircraft tire can be developed, the tread belt can be changed without removing the tire/wheel/brake assembly from the aircraft, thus reducing maintenance costs and aircraft out-of-service time. In addition, ninety percent of the expensive conventional tire building equipment can be eliminated and human error could be reduced through cast tire automation. If a thermoplastic polyester material is used in the cast tire, additional savings can be realized by recycling the material after the tire has been removed from service, thus reducing the petroleum requirements of conventional tire building and eliminating conventional tire disposal problems. Therefore, with the advantages and potential cost savings offered by cast tires, the development of cast tires for military aircraft was pursued.

[illegible] laboratory development of the cast tire [illegible]. Results of this work are reported in the technical report [illegible], "Static and Dynamic Analysis of Cast and Cast Carcass Tires," [illegible]. While the results of this work did not meet all expectations, they were encouraging enough to continue additional investigations. Subsequently, the recent three-phase program was initiated with [illegible] Inc., under contract F33615-76-C-3062. The results of Phase I [illegible] materials survey and evaluation, [illegible] documented in technical report [illegible], "Development of Cast Carcass Tires for Military Aircraft," July 1977. The results of Phase II (design development) and Phase III (design optimization) of this contract are documented in this technical report. Three basic cast tire designs were developed and evaluated in Phases II and III; the one-piece cast tire, the cast carcass/replaceable tread tire and the cast carcass/integral tread tire. The third design (integral tire) evolved from test results of the previous two designs.

During the course of the program, three one-piece cast tire designs, two cast carcass/replaceable tread tire designs, and 25 cast carcass/integral tread tire designs were developed and evaluated. The carcasses of all the tire designs were of a continuous toroidal construction without textile cord reinforcement or bead bundles. These tire carcasses were rotationally cast molded from a thermoplastic, polyester, elastomer called "Hytrel".* Five cast "Hytrel" materials were evaluated, some of which included chopped glass fibers for material reinforcement.

Each of the tire designs was subjected to an extensive series of static and quasi static tests, and dynamic laboratory tests in accordance with the military aircraft tire specification MIL-T-5041 and the A-37 main gear tire specification, USAF DWG 67J1951. Test results are discussed and compared to baseline A-37 main gear conventional bias tire results.

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*Dupont Trade Name

2. OBJECTIVES

a. Overall Objective

To investigate if a cast carcass tire with or without a conventional rubber tread belt is a practical concept for military aircraft.

b. Specific Objectives

(1) Phase I

To survey and evaluate currently available off-the-shelf thermoset and thermoplastic materials for potential use in cast/molded tires for military aircraft.

(2) Phase II

To develop, laboratory test, and evaluate a one-piece cast tire and/or a cast carcass/replaceable tread tire and/or a cast carcass/integral tread tire which can satisfactorily meet the dynamic requirements of a high performance military aircraft tire.

(3) Phase III

To optimize a final prototype cast tire design.

SECTION II

SUMMARY

This report describes work undertaken during Phases II and III of a three Phase program initiated with Zedron Inc., to establish the potential of cast tires for application to Air Force aircraft. Phase I of this effort was a materials survey, the results of which are documented in AFFDL-TR-77-51, "Development of Cast Carcass Tires for Military Aircraft." The current program Phases II and III involved static, quasi-static, and dynamic laboratory test and evaluation of thirty 7.00-8 Type III cast tire designs. These designs included tire carcasses which were rotationally cast/molded from thermoplastic polyester materials (Hytrels) of various hardness with and without reinforcements. Three basic cast tire designs were developed and evaluated during Phase II efforts; the one-piece cast tire, the cast carcass/replaceable tread tire and the cast carcass/integral tread tire.

The development of the one-piece cast tire was terminated after three design iterations (15 tires) were evaluated due to its shortened dynamic life caused by tread groove failures (areas of high stress concentration).

The development of the cast carcass/replaceable tread tire was terminated after two design iterations (10 tires) were evaluated primarily due to tread derailment problems caused by insufficient expansion of the carcass required to keep the tread belt on. These designs, however, represent a considerable improvement over the one-piece cast tire designs as the tread groove failures (areas of high stress concentration) were eliminated by replacing the thermoplastic material with conventional tire materials in the tire tread.

The remainder of Phase II (Design Development) and all of Phase III (Design Optimization) involved the development, test, and evaluation of the cast carcass/integral tread tire. The integral tread tire is a

rotationally cast thermoplastic carcass with a conventional rubber compound (aramid cord reinforced) tread belt. Unlike the replaceable tread tire, the tread belt of the integral tire is fabricated, glued, and cured in place on the cast carcass which rendered it non-replaceable. The integral tread tire designs incorporated the same qualities or improvements as the replaceable tread tire but it eliminated the tread derailment problems of the replaceable tread tire.

Twenty-five integral tire design iterations (105) tires, some of which included glass reinforcement, were tested and evaluated to the A-37 aircraft main gear tire specifications. The testing resulted in the following significant achievements:

•Successfully completed one-hundred A-37 qualification takeoff cycles. Each of these test cycles consisted of a simulated takeoff (excluding the taxi) from 0 mph to a liftoff speed of 150 mph at an initial load of 6650 lbs which decreased linearly to 0 lbs at liftoff.

•Withstood 91% (400 psig) of the burst test pressure requirements.

•Successfully completed 2.65 taxi miles (14,000 ft) at a rated load of 6650 lbs and a taxi speed of 30 mph.

•Successfully completed 1500 continuous miles at a reduced load of 1500 lbs and a taxi speed of 30 mph.

Even though these results are considered significant achievements for a cast thermoplastic, polyester, elastomer tire, they fall far short of the full A-37 main gear tire qualification due to the tire's inability to complete the required taxi rolls at rated (6650 lbs) load without incurring permanent structural damage.

The major shortcomings of the integral tire designs were the thermoplastic, elastomer material's susceptibility to material creep and flex cracking which occurred during the taxi rolls at rated load and at high tire deflections.

The major shortcomings of the rotational cast process were the inability to maintain a uniform wall thickness around the toroidal cross section of the tire causing areas of high stress concentration and localized heating (promoting material creep) during dynamic testing and the inability to obtain a proper material cure from tire to tire (poor repeatability) causing material degradation and a loss of material mechanical properties in some of the tires.

SECTION III

DESCRIPTION OF TEST TIRES

During the course of this contract, three basic 7.00-8 cast tire designs were developed; the one-piece cast tire, the cast carcass/replaceable tread tire, and the cast carcass/integral tread tire shown in Figures 1 through 10. The conventional 7.00-8/16 PR bias tire is shown in Figures 11 and 12 for comparison. The aspect ratio (section height/section width) of the low profile cast tire designs ranged from 0.63 to 0.67. The carcasses of all the tire designs were of a continuous closed toroidal construction without textile cord reinforcement or wire bead bundles. These tire carcasses were rotationally cast/molded from a thermoplastic, polyester, elastomer called "Hytrel". Five "Hytrel" base materials 6346, 5556, 5555HS, 5526, and 4056 were evaluated. A summary of the various cast tire designs is listed in Table 1. The hardness of the base polymer is designated in shore "D" hardness by the first two digits of the identification number. For example, base polymer 6346 had a hardness of 63 shore "D" prior to the addition of reinforcement fillers or plasticizers. The tread belt adhesives, and the thermal cure cycles for the cast carcasses and tread belts are listed in Table 2. The basic differences in the materials were hardness, melt index values or high temperature properties. These high strength, high molecular weight polymer systems consisted of a plastic (hard phase) and an elastomer (soft phase). These base polymers were also modified by adding carbon black, plasticizers such as Benzoflex and glass fillers such as glass flake, glass strand, and chopped glass. The glass loading and the strand or fiber length of the glass fillers were varied to evaluate how the reinforcement of the hard phase and the filler dispersal in the base polymer was affected. The glass fillers were also treated with various sizing agents such as silane to improve their adhesion to the polyester substrate. The carbon black was dropped in the later designs since it was added primarily for color or aesthetic purposes. Hence, the carcasses of the later designs appear white instead of black.

Due to the closed toroidal construction of the carcass, a rubber valve was glued in the tire's sidewall for inflation purposes. Internal air pressure leakage around the valve was a problem in some of the initial designs but was corrected by using a better adhesive. In the later designs, a second valve was added to the opposite sidewall in order to introduce nitrogen into the tire cavity during the cure process in order to eliminate internal oxidation and material property degradation. This second valve introduced valve retention problems in the last designs and actually prevented some of the last tires from being tested as the contract was terminated before this deficiency was corrected. It is felt that a mold rework on the second valve providing a better valve fit would correct the problem.

Reference 1 contains a detailed analysis of the polyester material properties with and without reinforcements, the tire carcass and tread manufacturing process, the tread rubber formulations, a description of the rotational cast equipment, and process and procedures.

The rotational cast/molding machine is shown in Figure 13, while a mold spider loaded with tire molds entering the oven is shown in Figure 14. Figure 15 shows a close-up of the one-piece cast tire mold. The replaceable tread belts were laid up on an orbitread building machine shown in Figure 16. A close-up of the expandable mandrel for the tread layup is shown in Figure 17. The four ply tread belts were laid up with two circumferential polyester belt plies +1/2°, -1/2° cord angle, respectively, one radial polyester belt ply (89°) cord angle, then one circumferential polyester belt ply +1/2° cord angle, followed by circumferential high strength aramid reinforcement cords randomly dispersed across the tread section.

The tread belt of the cast carcass/integral tread tire was laid up, glued, and cured in place on the cast carcass rather than on the orbitread unit. The tread belt was reinforced by circumferential high strength aramid cords randomly dispersed in the upper tread area. This tire design evolved from the two previous designs and eliminated the tread derailment problems of the replaceable tread tire, and the groove cracking of the one-piece cast tire.

SECTION IV

TEST EQUIPMENT

The laboratory tire tests were conducted in the Flight Dynamics Laboratory Landing Gear Development Facility using the flat surfaced Tire Force Machine (TFM), the 120 inch programmable dynamometer, and the 84 inch conventional dynamometer.

1. TIRE FORCE MACHINE (TFM)

The TFM was used for the quasi-static and some of the static mechanical tire property measurements recorded while under aircraft wheel loads with combined steering on a flat surface. The force measuring system consists of six load cells (3 vertical, 2 fore-aft and 1 lateral) instrumented to measure all six force and moment components developed by the tires. The machine is designed to permit low speed tests at yaw angles between ±90 degrees (this ±90 degrees position was used for the lateral stiffness tests) and any desired value of longitudinal slip.

A Houston Instrument Omnigraphic (X-Y plotter) recorder was used in the load-deflection tests. A Gould Brush (8 channel strip chart) recorder was used in the lateral force and aligning torque tests.

2. 120 INCH PROGRAMMABLE DYNAMOMETER

This dynamometer, incorporating a force measuring system similar to the TFM, has the capability of programmable yaw, camber, radial load, wheel velocity, wheel acceleration, and sink rate. The taxi takeoff cycles, takeoff only cycles, taxi rolls, and cambered taxi rolls were conducted on the 120 inch dynamometer.

3. 84 INCH CONVENTIONAL DYNAMOMETER

The 84 inch dynamometer is used for taxi takeoff cycles and high speed brake stops controlled by an electro-mechanical servo system. Some of the static measurements and taxi rolls were conducted on the 84 inch dynamometer.

Descriptions and capabilities of the TFM, the 120 inch, and 84 inch dynamometers are listed in the Flight Dynamics Laboratory Landing Gear Development Facility Brochure.

SECTION V

TEST REQUIREMENTS AND PROCEDURES

1. STATIC TESTS

a. Dimensional and Physical Data

The cast tires were mounted on a 7.00-8 production aircraft wheel which has a 9.624 inch flange diameter, 8.0 inch bead seat diameter, and a 5.5 inch width between flanges. The wheel contours and dimensions are shown in Table 3. After mounting the tires, the outside diameter (OD) and the cross section (CS) of the tires were measured and recorded at 20 psig intervals from 0 psig to 160 psig inflation pressures to check static growth properties.

In addition, one tire of each cast tire design was inflated to rated inflation pressure (125 psig) and monitored continuously for 60 hours to check for material porosity and material permeability.

b. Dimensional Stability Data

One tire of each cast tire design was inflated and regulated to rated inflation pressure (125 psig) and the OD and CS were recorded continuously for 60 hours to check the dimensional stability of the tires.

c. Tire Contact Area

The contact area prints (footprints) were obtained for each cast tire design when loaded against a flat surface at rated load (6650 lbs), 60 rated load (3990 lbs), and rated pressure (125 psig). The gross contact area of the tire footprint was measured and is defined as the total area of the print including the tread ribs and the spaces (tread grooves) between the tread ribs. The net area of the print was also measured and is the summation of the individual tread rib (dark) areas where tread material contacts the flat surface.

d. Vertical Load Vs Deflection Data

Vertical load vs vertical deflection curves were obtained on each tire design when loaded on a flat surface at rated inflation pressure. In addition, vertical load vs vertical deflection loops were obtained on

some of the tire designs at inflation pressures of 90, 125, and 160 psig. All vertical load vs vertical deflection curves and loops were obtained at a deflection rate of 20 inches per minute. Tire spring rates and energy loss due to hysteresis were calculated.

e. Lateral Load Vs Deflection Data

Lateral load vs lateral deflection loops were obtained on the tungsten carbide surface on the tire force machine at vertical loads of 6300 and 6650 lbs and at rated inflation pressure of 125 psig. The lateral load deflection tests were conducted by determining the lateral load required to produce 100% slip and then obtaining the lateral load deflection loops at a deflection rate of 20 inches per minute until +80% of the lateral slip load was achieved. Lateral stiffness was calculated from the lateral load deflection curves by two different methods. The first method involved taking the slope of a straight line of the load deflection curve from the origin to the tip of the loop. The second method used a straight line between the loop ends to establish the slope or stiffness.

f. Fore-Aft Load Vs Deflection Data

Fore-aft load vs fore-aft deflection loops were to be obtained on the tungsten carbide surface of the tire force machine at vertical loads of 6300, 6650, and 7000 lbs, and at a rated inflation pressure of 125 psig. The fore-aft load deflection tests were conducted by determining the fore-aft load required to produce 100% slip and then obtaining the fore-aft load deflection loops at a deflection rate of 10 inches per minute until +80% of the fore-aft slip load was achieved. The same two methods used to calculate lateral stiffness were also to be used to determine fore-aft stiffness.

g. Burst Test Data

One cast tire of each design was to be inflated at an inflation rate of approximately 30 psig per minute until the minimum burst pressure of 441 psig was reached and maintained for a minimum of ten seconds.

2. QUASI-STATIC (LOW SPEED) FLAT SURFACE TESTS

a. Lateral Force Data

Lateral force data was obtained on the dry and wet (1/2 inch water) tungsten carbide surface of the low speed (0.17 mph) tire force machine at vertical loads of 6300, 6650, and 7000 lbs, at a rated inflation pressure of 125 psig, and at slip angles of $\pm 2°$, $+4°$, $+6°$, $+8°$, $+10°$, and $+12°$.

b. Aligning Torque Data

Aligning torque data was obtained on the dry and wet (1/2 inch water) tungsten carbide surface of the low speed (0.17 mph) tire force machine at vertical loads of 6300, 6650, and 7000 lbs, at a rated inflation pressure of 125 psig, and at slip angles of $+2°$, $\pm 4°$, $\pm 6°$, $+8°$, $\pm 10°$, and $+12°$.

3. DYNAMIC (HIGH SPEED) DYNAMOMETER TESTS

The following is taken from USAF Drawing Specification 67J1951:

a. The tire shall withstand 100 cycles of (1) and (2) and 50 cycles of (3) without evidence of failure.

(1) Taxi Takeoff Maximum Load - The tire shall be taxied on the flywheel for 14,000 feet at 30 mph and at a load of 6650 pounds. Stop the flywheel, keeping the tire fully loaded. Then accelerate the flywheel (simulating takeoff) at a rate of 10 ft/sec/sec to a speed of 150 mph. The tire shall be unlanded after a roll distance of 2420 feet is reached. The load of 6650 pounds shall be maintained for 5 seconds at which time the load shall be decreased linearly with time to 0 load at approximately 22 seconds after the start of takeoff at which time the tire shall be unlanded.

(2) Low Speed Mil-SPEC Landing - A test cycle identical to the low speed (90 - 0 mph) dynamic test described in military specification MIL-T-5041 calculated for a tire load of 6650 pounds shall be conducted.

(3) Combined Radial-Side Load Roll Test - The radial load shall be 6700 pounds; the side load acting inboard shall be 1500 pounds. The tire shall be rolled 1500 feet each cycle at 20 mph. This test may be conducted by camber or yaw conditions.

SECTION VI

TEST RESULTS AND DISCUSSION

1. STATIC TESTS

a. Dimensional and Physical Data

Dimensional growth in the tire's OD and CS width due to increases in inflation pressure for the one-piece, two-piece, and the integral cast tire are plotted and compared to the baseline bias tire in Figures 18, 19, and 20.

Unlike the baseline bias tire, the cast tire designs exhibited a much more linear growth in OD. The overall growth of the one-piece cast tire in OD over the inflation pressure range of 0 - 150 psig was less than the baseline bias tire for two of the designs and slightly greater for the third design. The growth in cross section width of all three one-piece cast tire designs was roughly equivalent and the curves were characteristically similar to the baseline bias tire.

Both the two-piece and integral cast tire designs exhibited considerably less growth in OD and slightly greater growth in CS than the baseline bias tire.

A summary of the various cast tire designs, carcass weights, tread belt weights, outside diameter, and section width dimensional data is listed in Table 1.

Since the primary objective of this effort was to investigate if the cast tire concept is a viable concept (structurally capable) for high performance military aircraft tires, minimal effort was expended to optimize the total tire weight or maintain the tire's dimensional envelope in accordance with the military specifications. Hence, many of the designs exceeded the 24 pound maximum allowable tire weight and the maximum OD and CS dimensions of 20.85 inches and 7.3 inches, respectively.

b. Dimensional Stability Data

The dimensional stability in the OD and CS of the various cast tire designs were measured, recorded, plotted, and compared to the baseline bias tire in Figures 21, 22, and 23. This dimensional data was obtained with the tires inflated to 125 psig inflation pressure and monitored for 60 hours. The dimensional stability of all the cast tire designs under static inflation was better than the baseline bias tire. The two integral cast tire design growth curves presented are typical of all the integral cast tire designs. The set-up for the dimensional tests is shown in Figures 24 and 25.

c. Tire Contact Area (Footprint Data)

Tire contact area prints were obtained for the baseline bias tire and all the cast tire designs at rated inflation pressure (125 psig) while loaded on a flat surface at rated load (6650 lbs) and at 60 rated load (3990 lbs). The maximum footprint length and width were measured and listed in Table 4. The gross and net contact areas of the footprints are listed in Table 4 and plotted in Figures 26, 27, 28, and 29. The 40 "D" Hytrel material integral cast tire designs came very close to matching the gross and net contact areas of the baseline bias tires whereas the remaining integral cast tire designs ranged from 7 to 36 less than the baseline bias tire. The one-piece cast tire designs ranged from 30 to 50 less in gross and net contact area while the two-piece cast tire designs ranged from 10 to 30 less in gross and net contact areas of the baseline bias tire. All of the contact area prints are presented in Appendix C.

d. Vertical (Radial) Load Vs Vertical Deflection Data

Vertical load vs vertical deflection loops were obtained up to a radial load of 7000 lbs on a flat plate. Tire vertical spring rates and energy loss due to hysteresis are listed in Table 5. A plot of vertical load vs vertical deflection at 125 psig inflation pressure comparing the relative vertical stiffness of the various cast tire designs with that of the baseline tire is presented in Figure 30. The vertical stiffness of most of the cast tire designs averaged approximately 40 greater than the baseline bias tire and ranged from 16 below to 70 above the baseline

value. Many of the cast tire designs exhibited lower energy loss due to vertical load than the baseline bias tire. This fact plus the generally greater vertical stiffness resulting in lower tire deflections of the cast tires offer some explanation as to why the cast tires ran cooler during dynamic testing. Typical vertical load vs vertical deflection loops are presented in Figures 31 through 42. Vertical deflection vs vertical load curves were also obtained at three inflation pressures (90, 125, and 160 psig), at a rate of deflection of 20 inches per minute up to a load of 7000 lbs on a flat surface, and on the (curved surface) 84 inch diameter dynamometer. These plots are presented in Appendix D.

e. Lateral (Side) Load Vs Lateral Deflection Data

Lateral load vs lateral deflection loops were obtained on the tungsten carbide surface of the tire force machine. Lateral load vs lateral deflection plots at vertical loads of 6650 lbs and 6300 lbs are shown in Figures 43 through 51 and 52 through 60, respectively. The tire lateral spring rates (lateral stiffness) and energy loss due to hysteresis are listed in Table 6. The lateral stiffness of the integral cast tire designs ranged from 15% below to 15% above the baseline bias tire value. The lateral energy loss of the integral cast tire designs ranged from 19% below to 22% above the baseline bias tire value. The effective coefficient of friction obtained during the lateral load deflection tests of the integral cast tires ranged from 3% to 18% lower than the baseline bias tire. The test set up for the lateral load deflection tests on the tire force machine prior to loading the tire is shown in Figure 61. One of the one-piece cast tires (Design 3) was loaded laterally to its structural limit and failed catastrophically (Figures 62 and 63) at a lateral load of 7000 lbs.

f. Fore-Aft Load Vs Fore-Aft Deflection Data

Fore-aft load vs fore-aft deflection tests were set up on the tire force machine. Brake torque was applied to the tire through use of the TFM brake shown in Figure 64. The fore-aft load deflection tests were terminated due to slip at the tire/wheel interface. As much as one inch of circumferential slip occurred at 1000 ft-lbs of brake torque. This slippage problem would have to be addressed in later designs prior to dynamic brake qualification tests.

g. Burst Test Data

Static burst tests were to be conducted on all cast tire designs. The results of the burst tests are tabulated in Table 7 and plotted in Figures 65 and 66. None of the cast tire designs passed the minimum burst test requirement at the 30 psig per minute inflation rate even though some of the designs reached 91% of the minimum requirement. In order to check the effect of inflation rate and material creep due to internal inflation, a second integral cast tire of the S/N B088HX (Design 8) series was inflated to 465 psig in 30 seconds (high inflation rate) and maintained at this pressure. It failed catastrophically in approximately 56 seconds. Since this tire withstood the minimum required burst test pressure for 10 seconds, it essentially passed the burst test requirement. This burst test requirement, however, has shortcomings and is inadequate for evaluating polyester elastomer tires which are susceptible to plastic deformation and material creep. Typical failures which occurred during the burst tests of the various designs are shown in Figures 67 through 76. All the burst test failures showed some evidence of material creep. The creep initiated in areas of high stress concentration, e.g., the tread grooves of the one-piece cast tire, or in the beads, which along with the tread grooves were usually the thinnest wall section. There was also evidence of creep in the shoulder areas at the edge of the tread belt and in the crown under the tread belt at locations where the tread belt was yielding prior to belt failure.

The brittle failures normally occurred in the harder base polymer materials or in those designs with glass reinforcement. The brittle failures (cracking) probably initiated at sites of material imperfections (improper material cure) or most likely at thinned sections (material creep of the soft phase) or at locations of shock loading (tread belt failures).

The design with the highest burst pressure was the 5556 material, Design 21 (Table 1) with the number 21 thermal cure cycle (Table 2). This design had no carcass reinforcement (glass), a carcass weight of 17 pounds, and a tread belt weight of 10 pounds. The reason glass reinforcement was

not tried with the 5556 material was the inability of the contractor to obtain good glass dispersion in the base polymer during earlier sample tests.

The parameters which tended to affect the burst pressure were the shore "D" hardness of the base polymer, the material thermal cure, the tread belt weight and reinforcement or number of belts and aramid cords per square inch (end count), the carcass weight (amount of polymer used or carcass thickness), and glass reinforcement in the base polymer. The proper balance of carcass weight (thickness), thermal cure, glass reinforcement of the carcass, tread belt weight, and belt reinforcement produced significant increases in burst pressure of the various designs. The addition of the plasticizer, Benzoflex, decreased the burst pressure of a design, while the addition of carbon black had little or no effect on the burst pressure through reinforcement of the soft phase of the rubber/plastic matrix of the polyester polymer. The addition of glass flake or chopped glass strand did not significantly affect the burst strength of the designs.

2. QUASI-STATIC (LOW SPEED) FLAT SURFACE TESTS

a. Lateral Force Data

Lateral force data was obtained on the dry and wet tungsten carbide surface of the tire force machine at three vertical loads and at rated inflation pressure. The test set up on the tire force machine is shown in Figures 77 and 78. Carpet plots of lateral force vs positive slip angle for three vertical loads are presented in Figures 79 through 97 and listed in Table 8 which compares the various cast designs with the baseline bias tire.

During the dry surface tests, the one-piece cast tire developed lateral forces approximately 40% greater than the baseline bias tire, whereas the two-piece cast tire developed lateral forces up to 7% greater than the baseline tire. The majority of the integral cast tire designs developed lateral forces which ranged from 1% to 17% greater than the baseline bias tire. Three of the designs tested, however, developed less lateral force than the baseline tire.

Under wet surface conditions, the bias tire exhibited a slight decrease in lateral force at all slip angles (Figure 95). Both the one-piece and two piece cast tires exhibited a slight decrease in the lateral force at small slip angles but exhibited considerable degradation in developed lateral force at slip angles greater than 6° shown in Figures 96 and 97.

b. Aligning Torque Data

Aligning torque data was obtained on the dry and wet tungsten carbide surface of the tire force machine at three vertical loads and at rated inflation pressure. Carpet plots of aligning torque vs positive slip angle for the three vertical loads are presented in Figures 98 through 116 and listed in Table 9 comparing the various cast tire designs with the baseline bias tire.

The results of the dry surface tests showed that the one-piece and two-piece cast tires developed greater aligning torque than the bias tire at slip angles less than 4°, while all the integral cast tire designs developed much less aligning torque than the baseline tire at all slip angles.

The wet surface tests showed a degradation in aligning torque for the baseline bias tire at slip angles greater than 6° (Figure 114). Both the one-piece and two-piece cast tires exhibited considerable degradation in aligning torque at all slip angles as shown in Figures 115 and 116.

3. DYNAMIC (HIGH SPEED) DYNAMOMETER TESTS

The results of the dynamometer tests for the various cast tire designs are tabulated in Table 10. It quickly became apparent that the most difficult phase of the A-37 main gear tire dynamic qualification tests was the 2.65 mile taxi rolls prior to each of the 100 takeoff cycles which required the tire to roll long distances at rated load (6650 lbs). Consequently, the 2.65 mile (14,000 ft) taxi roll was used as a relative gauge of merit for the various cast tire designs. The primary modes of failure during the taxi roll of the cast tire designs using the softer and more flexible polymer matrix was permanent set occurring through

localized heating in high stress concentration areas causing material creep and section thinning. Even though continuous contained air temperatures or surface temperatures could not be obtained on the cast tires, the results of periodic temperature measurements indicate that the cast tires ran much cooler than the bias tire. It is estimated that the cast tire contained air temperature never exceeded 150°F during the taxi tests. The tire designs which used the harder polymer or the softer polymer reinforced with glass tended to be brittle with a low resistance to flex cracking and subsequently failed due to a combination of fatigue cracking of the hard phase and material creep of the soft phase of the polymer matrix. The brittle failures (cracking) probably initiated at sites of material imperfections (improper material cure) or most likely at thinned sections or locations of shock loading (tread belt failure). The areas of high stress concentration were in the tread grooves and bead areas of the tire and at the shoulders along the edge of the tread belt.

The development of the one-piece cast tire was terminated after three design iterations (15 tires) were evaluated due to tread groove failures (areas of high stress concentration) as shown in Figures 117 and 118. The use of the base polymer 6346 was halted due to its poor resistance to flex cracking.

The development of the cast carcass/replaceable tread tire was terminated after two design iterations (10 tires) were evaluated due to tread derailment problems as shown in Figure 119. The probable cause of the tread derailment problems was the inability to obtain sufficient expansion in outside diameter of the cast polyester elastomer carcass to provide an adequate fit between the tread belt and carcass. These designs, however, represented a considerable improvement over the one-piece cast tire designs as the tread groove failures (areas of high stress concentration) were eliminated. In addition to the tread derailment problems, the two-piece replaceable tread tires failed in the bead areas due to section thinning or material creep (shown in Figure 120) and fatigue or flex cracking as shown in Figure 121. The stress concentration in the bead areas in the early designs were magnified by the sharp bead radius which existed in the 7.00-8 aircraft

wheel and in the cast tire mold. In order to reduce the stress concentration in the bead area without modifying the wheel, a set of aluminum bead rings with a larger bead radius was manufactured to fit the bead area of the wheel. The tire mold was then modified to fit the aluminum bead rings. This modification significantly reduced the stress concentration in the bead area of the later designs but the problem was not completely eliminated. The change in the bead radius contour can be seen by comparing Figures 7 and 10.

Two major problems with the rotational mold process itself or the contractors technique surfaced early in the program and hindered the development of a successful cast tire throughout the effort. These were the inability to maintain a uniform wall thickness around the toroidal cross section (an exaggerated case shown in Figure 120) and the inability to obtain a proper material cure from tire to tire (poor repeatability).

The non-uniform wall thickness around the toroid inherently caused areas of high stress concentration and localized heating (promoting creep) during dynamic testing. An improper material thermal cure (Figure 122) caused material degradation, a loss of material mechanical properties and provided failure initiation sites.

The integral cast tire design with the best taxi performance was series number B088J(X) (Design 10) which successfully completed one complete taxi roll of 2.65 miles at a constant load of 6650 lbs and a test inflation pressure of 134 psig. This design used unmodified 5556 material with no glass reinforcement, a carcass weight of 17.5 pounds, and a tread belt weight of 7.5 pounds. The thermal cure used is listed as number 10 in Table 2. This tire failed due to material creep in the shoulder area at the belt edge during the second 2.65 mile taxi roll after 0.3 additional miles.

Several other designs exceeded one mile of taxi roll before failure occurred as indicated in Table 10. The integral tire designs using the softer polymers failed due to section thinning or material creep in the shoulder areas at the edge of the tread belt or in the

bead radius area. Typical examples of these failures are shown in Figures 123 through 129. The integral tire designs using the harder polymers and glass reinforced polymers failed due to fatigue (flex cracking) of the hard phase and material creep of the soft phase in the sidewall, shoulder, and bead areas. Typical examples of these failures are shown in Figures 130 through 134.

To assess the high speed takeoff capabilities of the integral tires, a tire of the B068C(X) series (Design 6) which did not perform that well during the taxi roll tests (failure at 0.37 miles), was subjected to the A-37 main gear tire takeoff profile (0 - 150 mph) with an initial load of 6650 lbs which decreased linearly to 0 lbs at lift off. The tire is shown in Figure 135 after successfully completing 20 takeoff cycles. The tire successfully completed 100 takeoff cycles and subsequently failed in the shoulder area (shown in Figure 136) during the first taxi test after 0.2 roll miles.

During several design iterations, the cast tire mold in the shoulder area was remachined to relieve the stress concentration in the cast tire carcass at the edge of the tread belt. This rework of the tire mold was successful in reducing the stress concentration in the shoulder area but it did not completely eliminate failures in the shoulder area.

Tire slippage at the tire/wheel interface (bead area) was a problem during one taxi test. Approximately 3.5 inches of circumferential slip (shown in Figure 137) was measured after the dynamic taxi test of the B068C(X) series tire (Design 6).

In order to check the effect of the tire load on taxi endurance life of a cast tire, three tires of the B088I(X) series (Design 9) and two tires of the B088J(X) series (Design 10) were tested at different loads. The results of these tests (Table 11) show the B088I(X) series tire tested at 1500 lbs load rolled 1500 continuous miles before failure occurred. These results indicate the order of magnitude that load affects the cast tire life.

To check the effect of tire inflation pressure on taxi endurance life, the inflation pressure was varied on three tires of two different design series. The results of these tests (shown in Table 12) indicate that changes in inflation pressure of this magnitude do not affect the taxi endurance life of cast tires. In one case, both the inflation pressure and test load were reduced considerably. The endurance life of this tire was extended significantly but it is felt that the load reduction was the primary reason for the extended tire life.

In an attempt to reduce material oxidation which occurred inside the cast tires during their thermal cure cycle, nitrogen was pumped into the tire cavity during the thermal cure cycle at 1.5 psig pressure. This procedure appeared to reduce the internal material oxidation but the early termination of the contract did not allow sufficient development and evaluation time.

Early in the last year of the three year program, the contractor experienced insurmountable financial difficulties in other areas of the company and they were forced to prematurely terminate the Air Force cast tire contract. With the contract duration time considerably shortened, the probability of developing a successful integral cast tire design for use on military aircraft was significantly reduced. Even so, considerable achievements were accomplished even though they fell far short of the original expectations.

SECTION VII

CONCLUSIONS

The results of the Phase II and Phase III static, quasi-static and dynamic testing of the various cast tire designs has led to the following conclusions:

1. The off-the-shelf materials tested in this program with and without glass reinforcement proved to be inadequate for use as a viable cast tire material for the A-37 military aircraft.

2. The integral cast tire proved to be the best tire design for quick or short term cast tire success as it eliminated the tread groove failures of the one-piece cast tire and the tread derailment problems of the two-piece cast tire.

3. The two-piece/replaceable tread cast tire has significant payoffs and potential for long term cast tire success but much development in the area of increased OD expansion of the stiff polyester cast carcass and tread retention needs to be done.

4. The unmodified, unreinforced 5556 "Hytrel" material had the best dynamic performance as it successfully completed three miles of taxi at rated load and attained the highest burst pressure (400 psig).

5. Glass fillers substantially increased the modulus of the base polymers by reinforcing the hard phase of the matrix but tended to make the resulting polymer brittle and have poor resistance to flex cracking. More development work is required in glass reinforcement techniques. Significantly, material creep still occurred in the soft phase of the glass reinforced polymers, since, only the hard phase was reinforced. To eliminate the material creep failures, the soft phase will have to be reinforced.

6. The thermal cure greatly affected the dynamic performance of the tires as an improper material cure caused material degradation and a loss in mechanical properties of the base polymer. A proper thermal cure and uniform material distribution around the toroidal tire proved very difficult to achieve with the rotational cast molding process.

7. The control and repeatability of a uniform wall thickness around the toroidal tire and at sharp radii proved to be very difficult with the rotational cast/mold process. This was especially true for the heavier wall thickness designs which were felt to be necessary for a cast tire of adequate strength.

8. Material oxidation which occurs inside the tire during the thermal cure cycle caused material degradation and must be eliminated. The introduction of an inert gas in the tires cavity is a possible solution but the termination of the contract did not allow sufficient time for a complete evaluation.

9. The materials tested in this effort seemed to provide adequate, if not superior, static dimensional stability, vertical and lateral stiffness, hysteresis, and frictional characteristics of specific cast tire designs when compared to the baseline bias tire.

10. The cast tire designs and materials were inadequate with respect to net and gross contact areas (footprint), fore-aft brake loads, aligning torque characteristics, burst test requirements and the dynamic tire qualification test requirements.

SECTION VIII

RECOMMENDATIONS

Since the contract was prematurely terminated before liquid injection molding (LIM) processes and thermoset polyurethane material tire designs could be evaluated, it is recommended that the LIM process and polyurethane material tire designs be evaluated at some future date.

In addition, with the advantages and potential cost savings offered by cast/molded tires, consideration should be given to the eventual development of polymers specifically structured for high performance military aircraft tire application without restricting the effort to off-the-shelf materials.

APPENDIX A

TABLES

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TABLE 1

CAST TIRE DESIGN DATA

DESIGN NUMBER	SERIES NUMBER	MATERIAL	FILLER	CARCASS WGT (LBS)	CARCASS THICKNESS RANGE (AVE) (IN)	MOLDING CYCLE*	TREAD BELT WGT (LBS)	BELT THICKNESS CROWN/SHOULDER (IN)	OUTSIDE DIA @ 125 PSIG (IN)	CROSS SECTION @ 125 PSIG (IN)
ONE-PIECE CAST TIRE:										
1	A077A(A)	5546	7 Plasticizer 0.5 Carbon Black	17.5	0.3[illegible] - 0.50	1	----	----	[illegible].57	[illegible]
2	A0975B(A)	5556	0.5 Carbon Black	14	0.25 - 0.4[illegible]	2	----	----	[illegible]	[illegible]
3	A0250(A)	5556	0.5 Carbon Black	17	0.30 - 0.56	3	----	----	[illegible].503	[illegible].511
TWO-PIECE (CAST CARCASS/REPLACEABLE TREAD BELT) TIRE:										
4	B097A(A)	5556	0.5 Carbon Black	14	0.25 - 0.45	4	12.[illegible]	0.51/0.31	[illegible].75[illegible]	[illegible]
5	B026B(A)	5556	0.5 Carbon Black	17	0.30 - 0.56	5	14	[illegible]/0.4[illegible]	[illegible].6[illegible]	[illegible].464
INTEGRAL (CAST CARCASS/GLUED TREAD BELT) TIRE:										
6	B0680(A)	5556	----	14	0.25 - 0.56	6	6	0.2[illegible]/0.57	[illegible].74	[illegible].595
7	B07[illegible]C(A)	5556	----	14	0.25 - 0.55	7	7	[illegible]/0.54	[illegible]	[illegible].55[illegible]
8	B0[illegible]H(A)	55[illegible]6	----	16	0.29 - 0.54		7.5	0.32/[illegible]	[illegible].77[illegible]	0.494
9	B0[illegible]I(A)	5556	Plasticizer 15 Benzoflex	17.5	0.34 - 0.59	9	7.[illegible]	0.32/[illegible]	[illegible].[illegible]37	0.449
10	B0[illegible](A)	5556	----	17.5	0.30 - 0.75	10	7.[illegible]	0.32/0.56	[illegible].755	0.415
11	B0[illegible]K(A)	5556HS	----	17.5	0.34 - 0.59	11	7.25	0.32/0.5[illegible]	[illegible].[illegible]79	[illegible]
12	B09[illegible]L(A)	5526	5 Chopped Glass 1/8" Strand (1156 sizing)	17.5	0.34 - 0.5[illegible]	12	[illegible]	0.24/0.52	[illegible].923	0.3[illegible]3
13	B0[illegible]M(A)	5526	5 Chopped Glass 1/8" Strand (3551 sizing)	1[illegible]	0.37 - [illegible]	13	7.[illegible]	0.26/0.54	[illegible].[illegible]75	0.382

*See Table 2

TABLE 1 (CONTINUED)

CAST TIRE DESIGN DATA

DESIGN NUMBER	SERIES NUMBER	MATERIAL	FILLER	CARCASS WGT(LBS)	CARCASS THICKNESS RANGE(AVE)(IN)	MOLDING CYCLE*	TREAD BELT WGT(LBS)	BELT THICKNESS CROWN/SHOULDER IN	OUTSIDE DIA @ 125 PSIG IN	CROSS SECTION @ 125 PSIG IN
14	[illegible]	5556	5 Glass Flake 1/8" diameter (A-1100)	[illegible]	0.38 - 0.62	14	7.	[illegible]	[illegible]	.436
15	B098O(X)	5556HS	5 Glass Flake 1/8" diameter (A-1100)	[illegible]	0.39 - 0.62	15	7.25	[illegible]	[illegible]	.331
16	B098P(X)	4056	3 Chopped Glass 1/4" Strand (3536)	24.0	0.55 - 0.9	16	7.0	[illegible]	[illegible]	[illegible]
17	B098Q(X)	5556HS	----	20.0	0.42 - 0.79	17	7.0	[illegible]	.874	[illegible]
18	B098R(X)	4056	----	24.0	0.50 - 0.85	18	7.	[illegible]	[illegible]	.473
19	B098S(X)	5556HS	3 Glass Flake 1/8" diameter (A-1100)	20.0	0.40 - 0.74	19	7.5	.32/.56	.777	.341
20	B098T(X)	5556HS	3 Chopped Glass 1/8" Strand (1156)	20.0	0.42 - 0.78	20	7.5	0.32/0.56	20.823	.324
21	B128U(X)	5556	----	17.0	0.32 - 0.58	21	10.0	0.50/0.65	20.922	[illegible]
22	B128V(X)	5556	----	17.0	0.30 - 0.56	22	10.0	0.50/0.65	20.930	.457
23	B029W(X)	5556	----	18.0	0.40 - 0.70	23	9.0	0.43/0.61	20.853	.475
24	B029X(X)	5556	----	18.0	0.39 - 0.68	24	9.0	0.43/0.61	20.861	.504
25	B029Y(X)	5556	----	18.0	0.37 - 0.64	25	9.0	0.43/0.61	20.813	.537
26	B029Z(X)	5556	----	18.0	0.38 - 0.65	26	9.5	0.46/0.63	20.855	.514
27	B029AA(X)	5556	Plasticizer 6 Benzoflex	17.5	0.32 - 0.63	27	9.0	0.43/0.61	20.861	.495
28	B029BB(X)	5556	Plasticizer 6 Benzoflex	17.5	0.33 - 0.61	28	10.0	0.50/0.65	20.866	.647
29	B029CC(X)	5556	Plasticizer 6 Benzoflex	18.5	0.39 - 0.66	29	10.0	0.50/0.65	20.805	.623
30	B029DD(X)	5556	Plasticizer 6 Benzoflex	18.0	0.37 - 0.67	30	9.0	0.43/0.61	20.856	.413

*See Table 2

[illegible]

Table [illegible]

[illegible] THERMAL [illegible] DATA

[illegible]	[illegible]	TREAD BELT CURE	BELT ADHESIVE
[illegible] TIRE:			
[illegible]	[illegible] Minutes oven time [illegible] °F [illegible] Minutes [illegible] cooling - doors [illegible] [illegible] Minutes cooling chamber [illegible] blower [illegible] [illegible] Minutes fine water spray [illegible] Minutes full water spray [illegible] Minutes cooling chamber - blowers on	N/A	N/A
	[illegible] Minutes oven time [illegible] °F [illegible] Minutes cooling chamber - doors open	N/A	N/A
	[illegible] Minutes oven time [illegible] °F [illegible] Minutes oven time [illegible] °F [illegible] Minutes air and water spray [illegible] Minutes oven cooling - doors open	N/A	N/A
[illegible] (REPLACEABLE TREAD BELT) TIRE:			
[illegible]	[illegible] Minutes oven time [illegible] °F [illegible] Minutes cooling chamber	75.0 Min @ 290°F	N/A
	[illegible] Minutes oven time @ 400°F 14.0 Minutes oven time @ 650°F 1[illegible] Minutes oven cooling with door open [illegible] Minutes air and water spray	90.0 Min @ 290°F	N/A
INTEGRAL (CAST CARCASS/GLUED TREAD BELT) TIRE:			
[illegible]	[illegible] Minutes oven time @ 640°F [illegible] Minutes oven cooling - doors open 1.0 Minute fine water spray 15.5 Minutes full water spray	60.0 Min @ 290°F	Whittaker OS-N/2
7	26.5 Minutes oven time @ 650°F [illegible] Minutes oven cooling - doors open 1.0 Minute fine water spray 1[illegible] Minutes full water spray	60.0 Min @ 290°F	Whittaker "Thixon" D-[illegible]22 Primer and CB-3166 cover coat
[illegible]	25.0 Minutes oven time @ 650°F [illegible] Minutes oven cooling - doors open 1.0 Minute fine water spray 15.[illegible] Minutes full water spray	60.0 Min @ 290°F	Whittaker OS-N/2
[illegible]	[illegible] Minutes oven time @ 650°F [illegible] Minutes oven cooling - doors open 1.0 Minute fine water spray [illegible] Minutes full water spray	60.0 Min @ 290°F	Whittaker OS-N/[illegible]

TABLE [illegible] (CONTINUED)

CAST TIRE THERMAL CYCLE DATA

MOLDING CYCLE NR	CARCASS THERMAL CYCLE	TREAD BELT CURE	BELT ADHESIVE
10	34.0 Minutes oven time @ 6[illegible]0°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 21.0 Minutes full water spray	60.0 Min @ 290°F	Whittaker GS-[illegible]
11	34.0 Minutes oven time @ 650°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 20.0 Minutes full water spray	60.0 Min @ 290°F	Whittaker GS-[illegible]
12	33.0 Minutes oven time @ 600°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 21.5 Minutes full water spray	45.0 Min @ 300°F	Whittaker D-[illegible] Primer and CB-3166 cover coat
13	33.0 Minutes oven time @ 600°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 24.0 Minutes full water spray	45.0 Min @ 290°F	Whittaker D-[illegible] Primer and CB-3166 cover coat
14	34.0 Minutes oven time @ 600°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 24.0 Minutes full water spray	45.0 Min @ 290°F	Whittaker D-6822 Primer and CB-3166 cover coat
15	34.0 Minutes oven time @ 600°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 24.0 Minutes full water spray	45.0 Min @ 290°F	Whittaker D-6822 Primer and CB-3166 cover coat
16	36.[illegible] Minutes oven time @ 650°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 25.[illegible] Minutes full water spray	45.0 Min @ 290°F w/50 PSIG cure pres	Whittaker D-6822 Primer and CB-3166 cover coat
17	45.0 Minutes oven time @ 600°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 25.0 Minutes full water spray	45.0 Min @ 290°F w/75 PSIG cure pres	Whittaker D-6822 Primer and CB-3166 cover coat
18	34.5 Minutes oven time @ 650°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 25.0 Minutes full water spray	45.0 Min @ 290°F w/50 PSIG cure pres	Whittaker D-6822 Primer and CB-3166 cover coat
19	34.5 Minutes oven time @ 650°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 25.0 Minutes full water spray	45.0 Min @ 290°F w/50 PSIG cure pres	Hughson "Chemlock" AP-133 Primer and 40[illegible] cover coat

TABLE 2 (CONTINUED)

CAST TIRE THERMAL CURE DATA

MOLDING CYCLE NR	CARCASS THERMAL CYCLE	TREAD BELT CURE	BELT ADHESIVE
20	34.5 Minutes oven time @ 650°F 0.5 Minutes oven cooling - doors open 1.0 Minute fine water spray 25.0 Minutes full water spray	45.0 Min @ 290°F w/50 PSIG cure pres	Hughson "Chemlock" AP-133 Primer and 402 cover coat
21	36.5 Minutes oven time @ 600°F, 1.5 PSIG N_2 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 1.0 Minute fine water spray, 1.5 PSIG N_2 25.0 Minutes full water spray, 1.5 PSIG N_2	45.0 Min @ 290°F w/75 PSIG cure pres	Hughson "Chemlock" AP-133 Primer and 402 cover coat
22	31.5 Minutes oven time @ 600°F, 1.5 PSIG N_2 5.0 Minutes oven time @ 600°F, no N_2 flow 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 1.0 Minute fine water spray, 1.5 PSIG N_2 25.0 Minutes full water spray, 1.5 PSIG N_2	45.0 Min @ 290°F w/75 PSIG cure pressure	Hughson "Chemlock" AP-133 Primer and 402 cover coat
23	47.0 Minutes oven time @ 550°F, 1.5 PSIG N_2 1.0 Minute oven time @ 550°F, no N_2 flow 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 3.0 Minutes fine water spray, 1.5 PSIG N_2 15.0 Minutes full water spray, 1.5 PSIG N_2 1.0 Minute air circulation, 1.5 PSIG N_2	60.0 Min @ 290°F w/75 PSIG cure pressure	Hughson "Chemlock" AP-133 Primer and 402 cover coat
24	46.0 Minutes oven time @ 550°F, 1.5 PSIG N_2 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 3.0 Minutes fine water spray, 1.5 PSIG N_2 15.0 Minutes full water spray, 1.5 PSIG N_2 1.0 Minute air circulation, 1.5 PSIG N_2	60.0 Min @ 290°F w/75 PSIG cure pressure	Hughson "Chemlock" AP-133 Primer and 402 cover coat
25	44.5 Minutes oven time @ 550°F, 1.5 PSIG N_2 4.0 Minutes oven time @ 550°F, no N_2 flow 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 3.0 Minutes fine water spray, 1.5 PSIG N_2 15.0 Minutes full water spray, 1.5 PSIG N_2 1.0 Minute air circulation, 1.5 PSIG N_2	60.0 Min @ 290°F w/75 PSIG cure pressure	Whittaker "Thixon" P-8 Primer and 501 cover coat
26	47.5 Minutes oven time @ 550°F, 1.5 PSIG N_2 1.0 Minute oven time @ 550°F, no N2 flow 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 3.0 Minutes fine water spray, 1.5 PSIG N_2 15.0 Minutes full water spray, 1.5 PSIG N_2 1.0 Minute air circulation, 1.5 PSIG N_2	60.0 Min @ 290°F w/75 PSIG cure pressure	Whittaker "Thixon" OS-N/2 (two coats)
27	41.5 Minutes oven time @ 550°F, 1.5 PSIG N_2 4.0 Minutes oven time @ 550°F, no N_2 flow 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 3.0 Minutes fine water spray, 1.5 PSIG N_2 15.0 Minutes full water spray, 1.5 PSIG N_2 1.0 Minute air circulation, 1.5 PSIG N_2	60.0 Min @ 290°F w/75 PSIG cure pressure	Hughson "Chemlock" AP-133 Primer and 402 cover coat

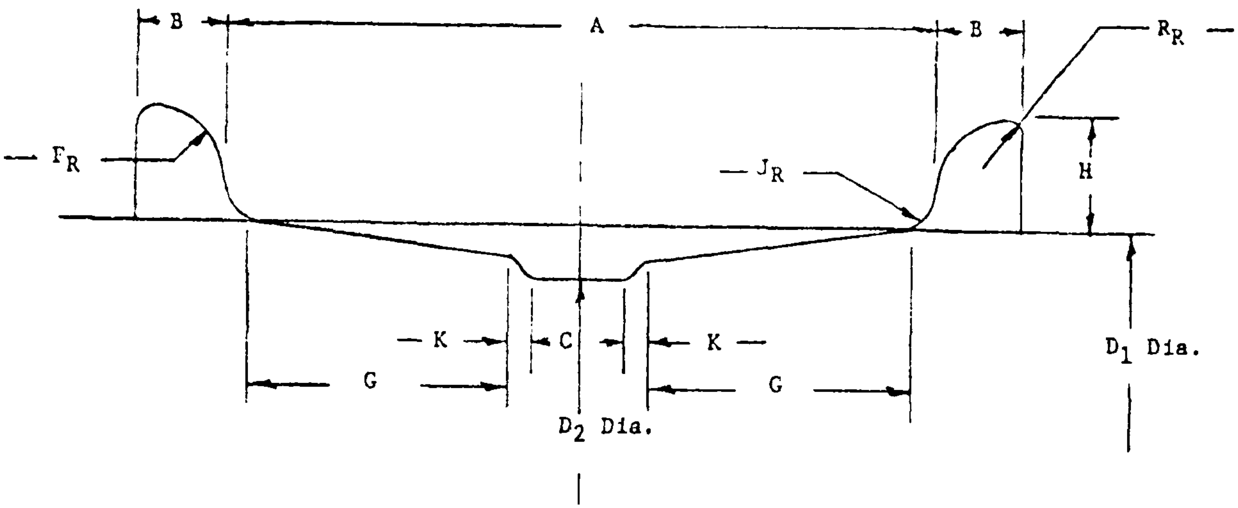
TABLE 2 (CONTINUED)

CAST TIRE THERMAL CURE DATA

MOLDING CYCLE NR	CARCASS THERMAL CYCLE	TREAD BELT CURE	BELT ADHESIVE
28	41.5 Minutes oven time @ 550°F, 1.5 PSIG N_2 4.0 Minutes oven time @ 550°F, no N_2 flow 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 3.0 Minutes fine water spray, 1.5 PSIG N_2 15.0 Minutes full water spray, 1.5 PSIG N_2 1.0 Minute air circulation, 1.5 PSIG N_2	60.0 Min @ 290°F w/75 PSIG cure pressure	Whittaker "Thixon" P-8 Primer and 501 cover coat
29	41.5 Minutes oven time @ 570°F, 1.5 PSIG N_2 4.0 Minutes oven time @ 570°F, no N_2 flow 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 3.0 Minutes fine water spray, 1.5 PSIG N_2 15.0 Minutes full water spray, 1.5 PSIG N_2 1.0 Minute air circulation, 1.5 PSIG N_2	60.0 Min @ 290°F w/75 PSIG cure pressure	Whittaker "Thixon" P-8 Primer and 501 cover coat
30	44.0 Minutes oven time @ 560°F, 1.5 PSIG N_2 0.5 Minutes oven cooling - doors open, 1.5 PSIG N_2 3.0 Minutes fine water spray, 1.5 PSIG N_2 15.0 Minutes full water spray, 1.5 PSIG N_2 1.0 Minute air circulation, 1.5 PSIG N_2	60.0 Min @ 290°F w/75 PSIG cure pressure	Whittaker "Thixon" P-8 Primer and 501 cover coat

TABLE 3

CONTOUR AND DIMENSIONS OF 7.00-8 WHEEL



Standard Rim Contours for Type III Aircraft Tires

A	B	C	D_1 Dia.	D_2 Dia.	F_R
5.50	0.656	0.925	8.00	7.381	0.406

G	H	J_R	K	R_R
1.400	0.812	0.203	0.750	0.062

Note: All Dimensions in Inches

TABLE 4

TIRE CONTACT AREA DATA
CAST TIRE FOOTPRINTS @ 125 PSIG

TYPE DESIGN	S/N	LOAD (LBS)	LENGTH (IN)	WIDTH (IN)	GROSS AREA (IN^2)	NET AREA (IN^2)	DEFL
STD TIRE	0920	6650	9.34	6.14	49.48	44.26	32.41
		3990	7.61	5.37	34.55	29.85	21.24
ONE PIECE TIRE	A077A1	6650	7.17	5.23	28.93	22.90	26.80
		3990	5.62	3.63	16.93	14.45	18.24
ONE PIECE TIRE	A097BB1	6650	8.46	6.00	37.96	30.60	32.77
		3990	6.77	4.35	23.17	17.47	22.34
ONE PIECE TIRE	A028C4	6650	8.02	5.72	35.72	28.76	30.57
		3990	6.38	4.36	21.91	17.13	20.87
TWO PIECE TIRE	B097A3	6650	7.63	6.49	43.36	36.85	25.24
		3990	5.95	6.24	30.44	25.50	16.22
TWO PIECE TIRE	B028B4	6650	7.27	6.37	40.76	35.74	22.95
		3990	5.78	6.25	28.76	23.82	14.64

TABLE 4 (CONTINUED)

TIRE CONTACT AREA DATA
CAST TIRE FOOTPRINTS @ 125 PSIG

INTEGRAL TIRE S/N	LOAD (LBS)	LENGTH (IN)	WIDTH (IN)	GROSS AREA (IN^2)	NET AREA (IN^2)	% DEFL
B068C1	6650	7.56	6.13	41.19	37.46	25.99
	3990	6.16	5.94	29.21	25.49	17.14
B078C4	6650	7.90	6.16	40.83	36.19	26.06
	3990	6.06	5.94	28.23	24.01	17.13
B088H3	6650	7.31	6.16	38.98	35.31	20.79
	3990	5.94	5.75	26.47	23.78	15.93
B088I4	6650	7.75	6.19	42.08	38.02	25.64
	3990	6.19	6.00	29.39	25.61	17.06
B088J3	6650	7.00	6.19	38.04	34.38	20.43
	3990	6.00	5.81	26.42	23.80	13.71
B088K4	6650	7.25	6.19	38.99	36.07	23.22
	3990	5.94	5.78	26.96	23.91	15.71
B098L3	6650	6.75	6.06	34.23	30.77	19.07
	3990	5.44	5.38	22.84	20.07	13.01
B098M2	6650	6.38	6.25	34.80	31.95	15.60
	3990	5.38	5.31	22.50	20.23	12.77

TABLE 4 (CONTINUED)

TIRE CONTACT AREA DATA
CAST TIRE FOOTPRINTS @ 125 PSIG

INTEGRAL TIRE S/N	LOAD (LBS)	LENGTH (IN)	WIDTH (IN)	GROSS AREA (IN^2)	NET AREA (IN^2)	DEFL
B098N2	6650	6.88	6.25	37.17	33.55	19.64
	3990	5.75	5.63	24.78	21.04	13.58
B09802	6650	6.94	6.31	38.00	35.19	20.46
	3990	5.50	5.63	24.86	21.73	13.46
B098P2	6650	8.00	6.50	45.27	40.55	29.32
	3990	6.00	6.25	30.96	27.57	19.24
B098Q3	6650	7.00	6.38	37.62	33.76	19.47
	3990	5.75	5.75	25.69	22.56	13.71
B098R2	6650	8.63	6.63	48.58	44.12	32.17
	3990	6.88	6.44	34.26	29.30	21.30
B098S3	6650	6.75	6.19	34.46	31.12	19.43
	3990	5.56	5.34	23.43	20.82	13.66
B098T2	6650	6.63	6.19	33.30	30.49	18.46
	3990	5.19	5.25	22.18	19.42	12.75
B128U3	6650	7.75	6.37	43.04	38.77	25.90
	3990	5.44	6.06	30.17	26.56	17.96

TABLE 4 (CONTINUED)

TIRE CONTACT AREA DATA
CAST TIRE FOOTPRINTS @ 125 PSIG

INTEGRAL TIRE S/N	LOAD (LBS)	LENGTH (IN)	WIDTH (IN)	GROSS AREA (IN^2)	NET AREA (IN^2)	[illegible]
B128V3	6650	7.18	6.25	42.39	[illegible]	[illegible]
	3990	6.31	5.69	[illegible]	[illegible]	[illegible]
B029W3	6650	7.50	6.31	[illegible]	[illegible]	[illegible]
	3990	6.00	6.00	[illegible]	[illegible]	[illegible]
B029X3	6650	7.38	6.31	[illegible]	[illegible]	[illegible]
	3990	6.06	[illegible]	[illegible]	[illegible]	[illegible]
B029Y3	6650	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	3990	5.91	[illegible]	[illegible]	[illegible]	[illegible]
B029Z3	6650	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	3990	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B029AA3	6650	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	3990	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	7.67	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	--
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	--
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	--
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	--
INTEGRAL TIRE S/N B128U3	5500	[illegible]	[illegible]	900
INTEGRAL TIRE S/N B098S2	[illegible]	6300	7200	1400
INTEGRAL TIRE S/N B128V3	5900	6500	7300	900
INTEGRAL TIRE S/N B098T3	6900	[illegible]	8200	--

[illegible] STATIC DATA

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N [illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
INTEGRAL TIRE S/N B[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1364	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
INTEGRAL TIRE S/N B[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1174	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N B12[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1174	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N B09[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
BASELINE BIAS TIRE S/N [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N B08[illegible]	[illegible]	3700	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N B09[illegible]	[illegible]	3740	[illegible]	2.20	[illegible]	1364	[illegible]	1579	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N B09[illegible]	3750	3690	2.40	2.30	[illegible]	1283	1273	1250	[illegible]	[illegible]	[illegible]	[illegible]
INTEGRAL TIRE S/N B088K2	3750	3500	2.75	2.75	1090	1018	1077	[illegible]	3800	3800	0.56	[illegible]

TABLE [illegible]

BURST TEST DATA

Tire Design	Tire No.	Material	Filler	[illegible]	Tread/Belt [illegible]	Burst Pressure (PSIG)	Percent of Required	Type Failure
One-Piece	A?77A?	5546	7 Benz*	17½		[illegible]	77	Brittle Failure - Crown & Tubewall
One-Piece	A?77A?	5546	7 Benz	17½		[illegible]	[illegible]	Brittle Failure - Crown & Sidewall
One-Piece	[illegible]475?4	[illegible]	[illegible] Carbon	1?		350	79	Material Creep - Outboard Center Groove
One-Piece	A??6?	5506	[illegible] Carbon	17		27?	61	Brittle Failure - Sidewall
Two-Piece	[illegible]	[illegible]	[illegible] Carbon	14	12½	395	90	Material Creep - Inboard Bead Extruded
Two-Piece	[illegible]	5506	[illegible] Carbon	17	12	360	82	Brittle Failure - Bead Cracked
Integral Tire	[illegible]	[illegible]	---	14	6	265	60	Material Creep - Crown & Belt Edge Extruded
Integral Tire	807?65	[illegible]	---	14	7	270	61	Material Creep - Crown Extruded/Belt Broke
Integral Tire	80?6H5	5556	---	1?	7½	340	77	Material Creep - Crown Extruded/Belt Broke
Integral Tire	808?H4	[illegible]	---	15	7½	465**	105	Material Creep - Bead Failure
Integral Tire	808?I5	5556	10 Benz	17½	7½	295	67	Material Creep - Inboard Sidewall
Integral Tire	808?J5	5556	---	17½	7½	345	78	Material Creep - Belt Edge Extruded & Cracked
Integral Tire	808?K?	5556?S	---	17½	7½	325	74	Material Creep - Belt Edge Extruded & Cracked
Integral Tire	809?L5	5526	5 Glass	17½	6½	325	74	Brittle Failure - Outboard Sidewall
Integral Tire	809?M5	5526	5 Glass	18	7	320	73	Brittle Failure - Outboard Sidewall
Integral Tire	809?N5	5526	5 Glass	18	7	290	66	Brittle Failure - Crown/Some Extrusion

* Benz refers to Benzoflex, a plasticizer

** Rapid or quick inflation rate

Minimum Required Burst Pressure - 441 PSIG

Approximate Inflation Rate - 30 PSIG/MIN

TABLE 7 (CONTINUED)

TYPE DESIG.	SERIAL NO	MATERIAL	FILLER	CARCASS WGT (LBS)	TREAD BELT WGT (LBS)	BURST PRESS (PSIG)	PERCENT OF REQUIRED	TYPE FAILURE
Integral Tire	B098O5	5555HS	3 Glass	16	7½	310	70	Material Creep - Outboard Bead Extruded
Integral Tire	B098P5	4056	3 Glass	24	7	220	50	Material Creep - Crown Extruded/Belt Broke
Integral Tire	B098Q5	5555HS	---	20	7½	360	82	Material Creep - Outboard Sidewall Extruded
Integral Tire	B098R5	4056	---	24	7½	180	41	Material Creep - Outboard Bead Extruded
Integral Tire	B098R2	4056	---	24	7½	185	42	Material Creep - Outboard Bead Extruded
Integral Tire	B098S5	5555HS	3 Glass	20	7½	365	83	Brittle Failure - Crown & Sidewall/Belt Broke
Integral Tire	B098T5	5555HS	3 Glass	20	7½	320	73	Brittle Failure - Outboard Sidewall
Integral Tire	B128U2	5556	---	17	10	400	91	Brittle Failure - Crown & Sidewall Belt Broke
Integral Tire	B128V2	5556	---	17	10	360	82	Brittle Failure - Crown & Sidewall Belt Broke
Integral Tire	B029W2	5556	---	18	9	350	79	Brittle Failure - Crown & Sidewall/Belt Broke
Integral Tire	B029X2	5556	---	18	9	330	75	Material Creep - Crown & Sidewall Extruded
Integral Tire	B029Y2	5556	---	18	9	350	79	Brittle Failure - Belt Edge Cracked
Integral Tire	B029Z2	5556	---	18	9½	380	86	Brittle Failure - Crown & Sidewall/Belt Broke
Integral Tire	B029AA2	5556	6 Benz*	17½	9	325	74	Brittle Failure - Crown & Belt Edge/Belt Broke
Integral Tire	B029BB2	5556	6 Benz	17½	10	380	86	Rubber Valve Failure - Valve Blew Out
Integral Tire	B029CC2	5556	6 Benz	18½	10	370	84	Material Creep - Outboard Bead Extruded
Integral Tire	B029DD2	5556	6 Benz	18	9	275	62	Rubber Valve Failure - Valve Blew Out

* Benz refers to Benzoflex, a plasticizer

Minimum Required Burst Pressure - 441 PSIG
Approximate Inflation Rate - 30 PSIG/MIN

TABLE 8

LATERAL FORCE (QUASI-STATIC TFM DATA)

LATERAL FORCE (LBS) @ VERTICAL LOAD OF 6650 LBS AND 12[illegible] PSIG INFLATION PRESSURE

	SLIP ANGLE / SURFACE CONDITION	2°	4°	6°	8°	10°	12°
BASELINE BIAS TIRE S/N 1006	DRY	500	980	1440	1880	2250	2650
BASELINE BIAS TIRE S/N 1006	WET	400	850	1300	1750	2150	2500
ONE-PIECE TIRE S/N A028C1	DRY	1000	1750	2250	2650	2900	3060
ONE-PIECE TIRE S/N A028C1	WET	850	1600	2100	2220	2400	[illegible]
TWO-PIECE TIRE S/N B028B1	DRY	600	1100	1550	1900	2150	[illegible]
TWO-PIECE TIRE S/N B028B1	WET	580	1050	1430	1600	1650	1800
INTEGRAL TIRE S/N B088I2	DRY	600	1100	1550	1950	2300	2650
INTEGRAL TIRE S/N B088J2	DRY	600	1150	1650	2050	2450	[illegible]
INTEGRAL TIRE S/N B038K2	DRY	350	650	980	1250	1550	[illegible]
INTEGRAL TIRE S/N B098L2	DRY	600	1250	1750	2200	2560	2900
INTEGRAL TIRE S/N B098M2	DRY	600	1200	1700	2100	2450	2700
INTEGRAL TIRE S/N B098N3	DRY	600	1250	1750	2200	2500	2730
INTEGRAL TIRE S/N B09802	DRY	550	1100	1600	2050	245	[illegible]
INTEGRAL TIRE S/N B098P3	DRY	400	850	1250	1650	1980	2250
INTEGRAL TIRE S/N B098Q2	DRY	580	1050	1500	1950	2300	2500
INTEGRAL TIRE S/N B098R3	DRY	450	840	1250	1580	--	--
INTEGRAL TIRE S/N B098S2	DRY	580	1100	1500	1900	2250	2400
INTEGRAL TIRE S/N B098T3	DRY	580	1100	1580	2000	--	--
INTEGRAL TIRE S/N B128U3	DRY	550	1050	1500	1900	2150	--
INTEGRAL TIRE S/N B128V3	DRY	550	1050	1500	1900	--	--

TABLE 9

ALIGNING TORQUE (QUASI-STATIC TFM DATA)

ALIGNING TORQUE (FT-LBS) @ VERTICAL LOAD OF 6650 LBS & 125 PSIG INFLATION PRESSURE	SLIP ANGLE / SURFACE CONDITION	2°	4°	6°	8°	10°	12°
BASELINE BIAS TIRE S/N 1006	DRY	92	175	255	310	355	175
BASELINE BIAS TIRE S/N 1006	WET	90	172	245	280	-	-
ONE-PIECE TIRE S/N A028C1	DRY	170	195	165	-	-	-
ONE-PIECE TIRE S/N A028C1	WET	155	125	122	-	-	-
TWO-PIECE TIRE S/N B028B1	DRY	135	185	210	225	-	-
TWO-PIECE TIRE S/N B028B1	WET	25	55	70	65	-	-
INTEGRAL TIRE S/N B088I2	DRY	85	143	180	-	-	-
INTEGRAL TIRE S/N B088J2	DRY	65	135	165	170	-	-
INTEGRAL TIRE S/N B088K2	DRY	105	170	215	230	-	-
INTEGRAL TIRE S/N B098L2	DRY	65	155	220	230	-	-
INTEGRAL TIRE S/N B098M2	DRY	70	140	195	215	-	-
INTEGRAL TIRE S/N B098N3	DRY	95	180	235	260	-	-
INTEGRAL TIRE S/N B09802	DRY	70	145	200	215	-	-
INTEGRAL TIRE S/N B098P3	DRY	65	135	195	240	-	-
INTEGRAL TIRE S/N B098Q2	DRY	65	110	125	130	-	-
INTEGRAL TIRE S/N B098R3	DRY	75	140	185	220	-	-
INTEGRAL TIRE S/N B098S2	DRY	35	60	85	100	-	-
INTEGRAL TIRE S/N B098T3	DRY	60	80	100	105	-	-
INTEGRAL TIRE S/N B128U3	DRY	75	130	175	195	-	-
INTEGRAL TIRE S/N B128V3	DRY	75	125	165	195	-	-

TABLE 10

TAXI TEST DATA, (30 MPH TAXI SPEED)

DESIGN NR	SERIES NR	TEST LOAD (LBS)	TEST PRESSURE (PSIG)	TEST DEFLECTION ( )	TAXI MILEAGE @ FAILURE (MILES)	FAILURE MODE
ONE-PIECE CAST TIRE:						
1	A077A(X)	6650	125	26.35	(0.35)	Groove Failure
2	A097BB(X)	6650	125	26.01	(0.20)	Groove Failure
3	A028C(X)	6650	125	32.05	(0.14)	Groove Failure
TWO-PIECE (CAST CARCASS/REPLACEABLE TREAD BELT) TIRE:						
4	B097A(X)	6650	125	25.56	(0.22)	Tread Belt Derailment
5	B028B(X)	6650	140	23.00	(0.61)	Tread Belt Derailment
INTEGRAL (CAST CARCASS/GLUED TREAD BELT) TIRE:						
6	B068C(X)	6650	134	26.96	(0.37)	Shoulder @ Belt Edge
7	B078C(X)	6650	134	26.56	(0.37)	Shoulder @ Belt Edge & @ Bead
8	B088H(X)	6650	134	24.79	(0.61)	O.B. Shoulder @ Belt Edge
9	B088I(X)	6650	134	22.93	(1.12)	Outboard Bead Extruded
10	B088J(X)	6650	134	22.23	(2.65)	Successfully Completed Taxi
11	B088K(X)	6650	134	23.66	(0.44)	O.B. Shoulder @ Belt Edge
12	B098L(X)	6650	134	16.69	(0.30)	O.B. Shoulder & Sidewall
13	B098M(X)	6650	134	16.23	(0.30)	Both Shoulders @ Belt Edge
14	B098N(X)	6650	134	15.82	(0.30)	Both Shoulders @ Belt Edge
15	B098O(X)	6650	134	18.62	(0.40)	O.B. Sidewall & Shoulder @ Belt Edge
16	B098P(X)	6650	134	26.30	(0.50)	Inboard Bead Extruded
17	B098Q(X)	6650	134	17.13	(1.80)	Split Crown Under Tread
18	B098R(X)	6650	134	26.87	(1.10)	O.B. Bead Extruded
19	B098S(X)	6650	134	16.11	(1.00)	Blowout @ Crown & Shoulder
20	B098T(X)	6650	134	12.76	(0.60)	Blowout @ Crown & Shoulder
21	B128U(X)	6650	140	23.47	(1.46)	Blowout @ Crown & O.B. Shoulder
22	B128V(X)	6650	140	23.49	(1.46)	Outboard Bead Extruded
23	B029W(X)	6650	134	22.95	(1.10)	Outboard Sidewall
24	B029X(X)	6650	134	22.27	(0.32)	Inflation Valve Failed
25	B029Y(X)	6650	134	22.75	(0.93)	Inflation Valve Failed
26	B029Z(X)	6650	134	---	--	Valve Failed During Inflation
27	B029AA(X)	6650	134	23.65	(0.56)	Inflation Valve Failed
28	B029BB(X)	6650	134	21.77	(0.31)	Inflation Valve Failed
29	B029CC(X)	6650	134	25.10	(0.10)	Inflation Valve Failed
30	B029DD(X)	6650	134	---	--	Valved Failed During Inflation

TABLE 11

TAXI TEST DATA
EFFECT OF TEST LOAD VARIATION

ESIGN NR	SERIES NR	TEST SPEED (MPH)	TEST LOAD (LBS)	TEST PRESSURE (PSIG)	TEST DEFLECTION (%)	TAXI MILEAGE TO FAILURE	MILES
9	[illegible]	[illegible]	[illegible]	[illegible]	8.21		[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	13.60		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	22.93		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.13		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	22.23		[illegible]

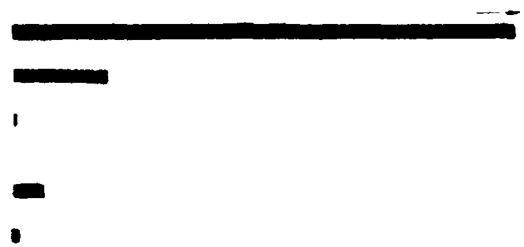
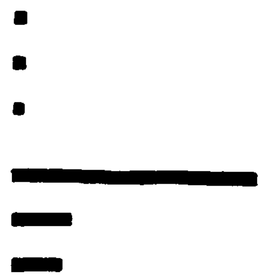


TABLE 1.

TAXI TEST DATA
EFFECT OF TEST PRESSURE VARIATION

DESIGN NR	SERIES NR	TEST SPEED (MPH)	TEST LOAD LBS	TEST PRESSURE PSIG	TEST DEFLECTION	[illegible]
[illegible]	[illegible]	3[illegible]	[illegible]	11[illegible]	3[illegible]	
[illegible]	[illegible]	3[illegible]	[illegible]	134	[illegible]	
7	[illegible]	3[illegible]	865	1[illegible]	2[illegible]	
1[illegible]	[illegible]	3[illegible]	15[illegible] *	[illegible]	[illegible]	
[illegible]	[illegible]	3[illegible]	[illegible]	1[illegible]	1[illegible]	
1[illegible]	[illegible]	[illegible]	[illegible]	14	[illegible]	



*Also includes effect of reduced test load

APPENDIX B

FIGURES AND PHOTOGRAPHS

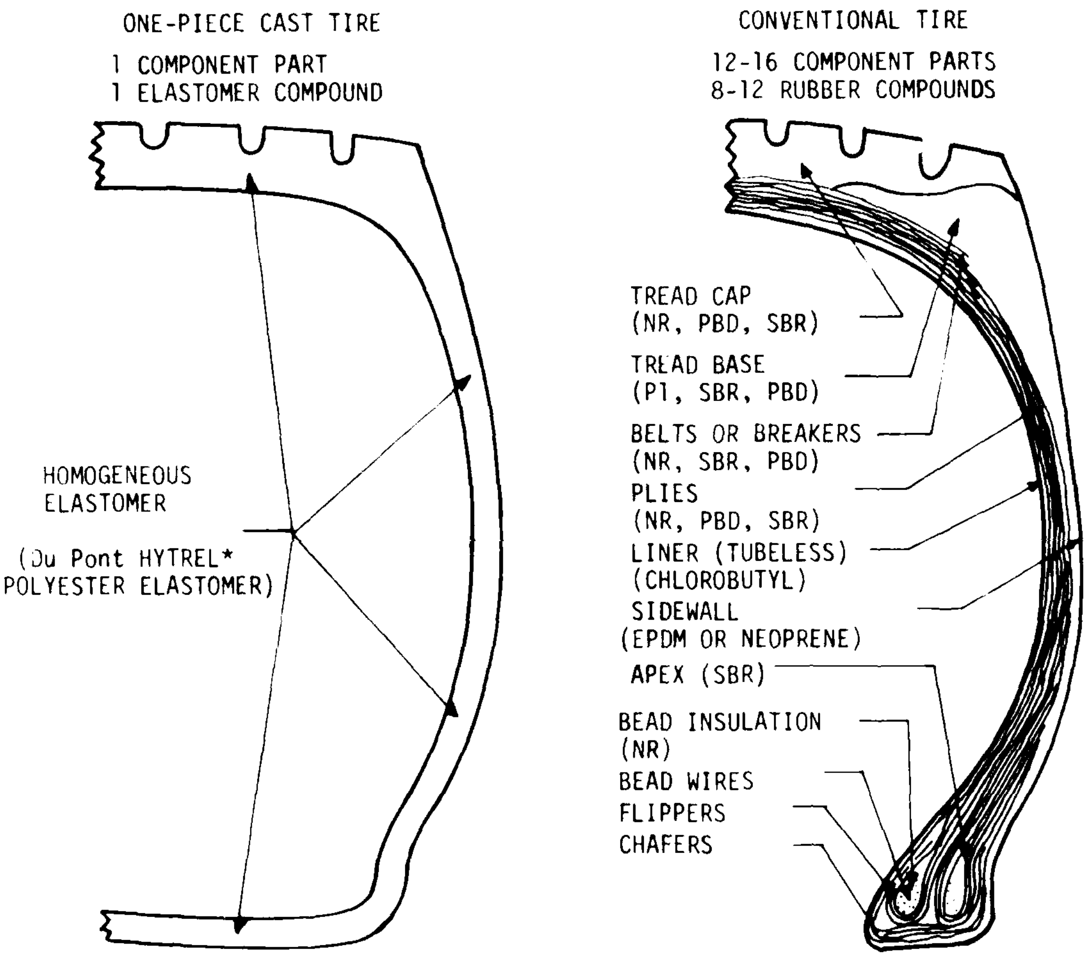


Figure 1. One-Piece Cast Tire Vs Conventional Tire-Comparison

Figure 2. 7.00-8 One-Piece Cast Tire

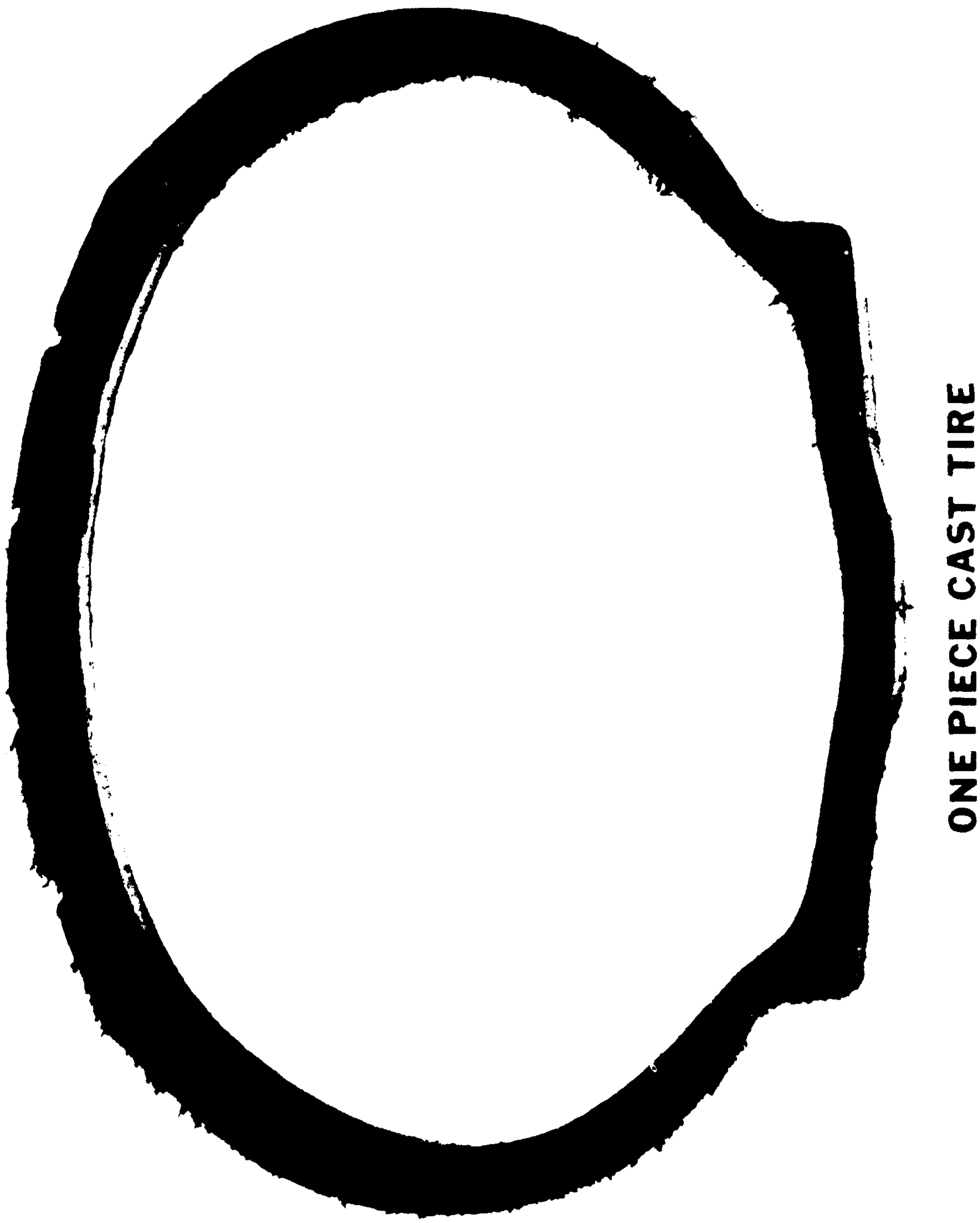


Figure 3. 7.00-8 One-Piece Cast Tire (Section)

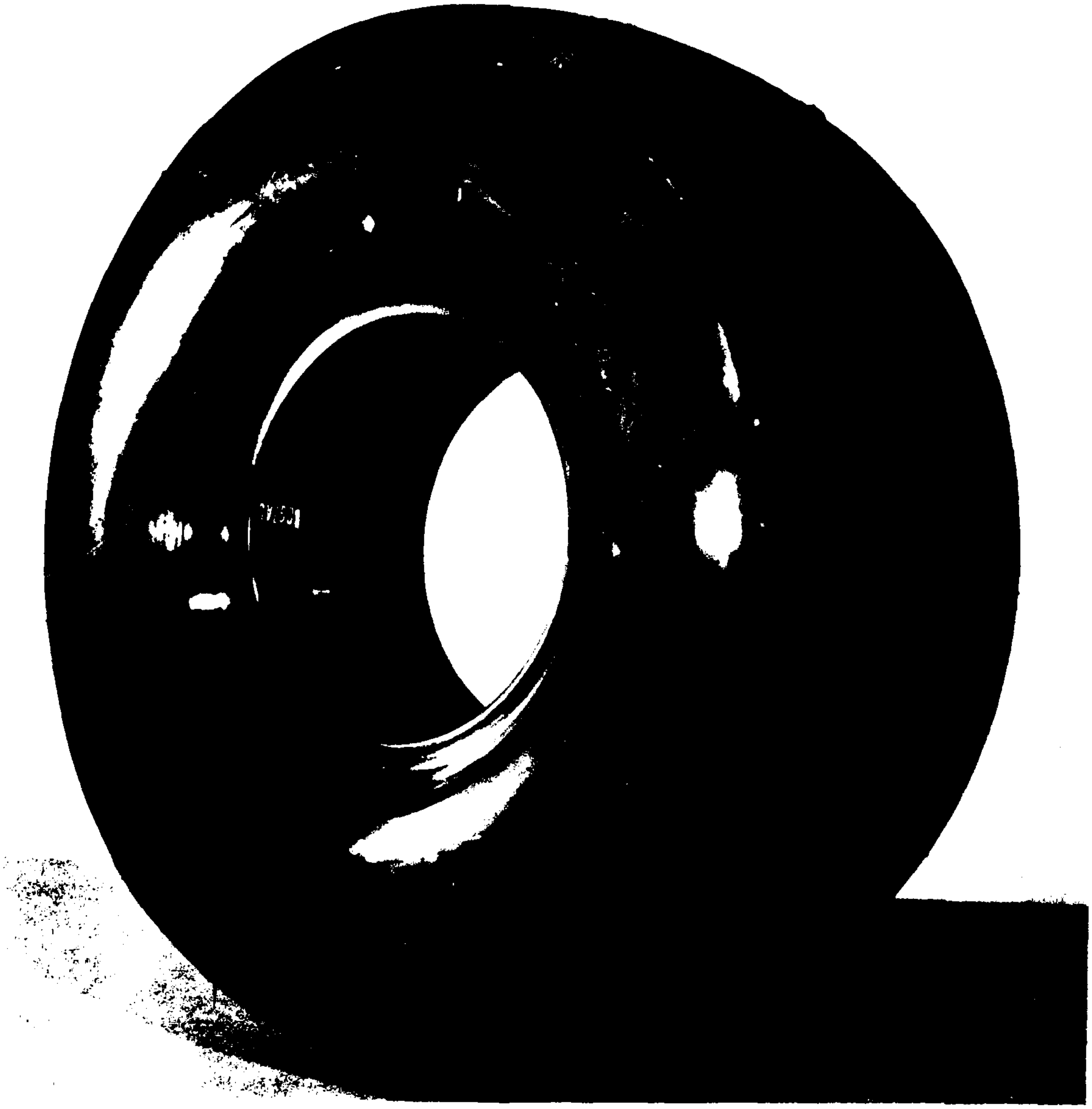


Figure 4. 7.00-8 Two-Piece Cast Tire

Figure 5. 7.00-8 Two-Piece Cast Tire (Carcass & Belt)

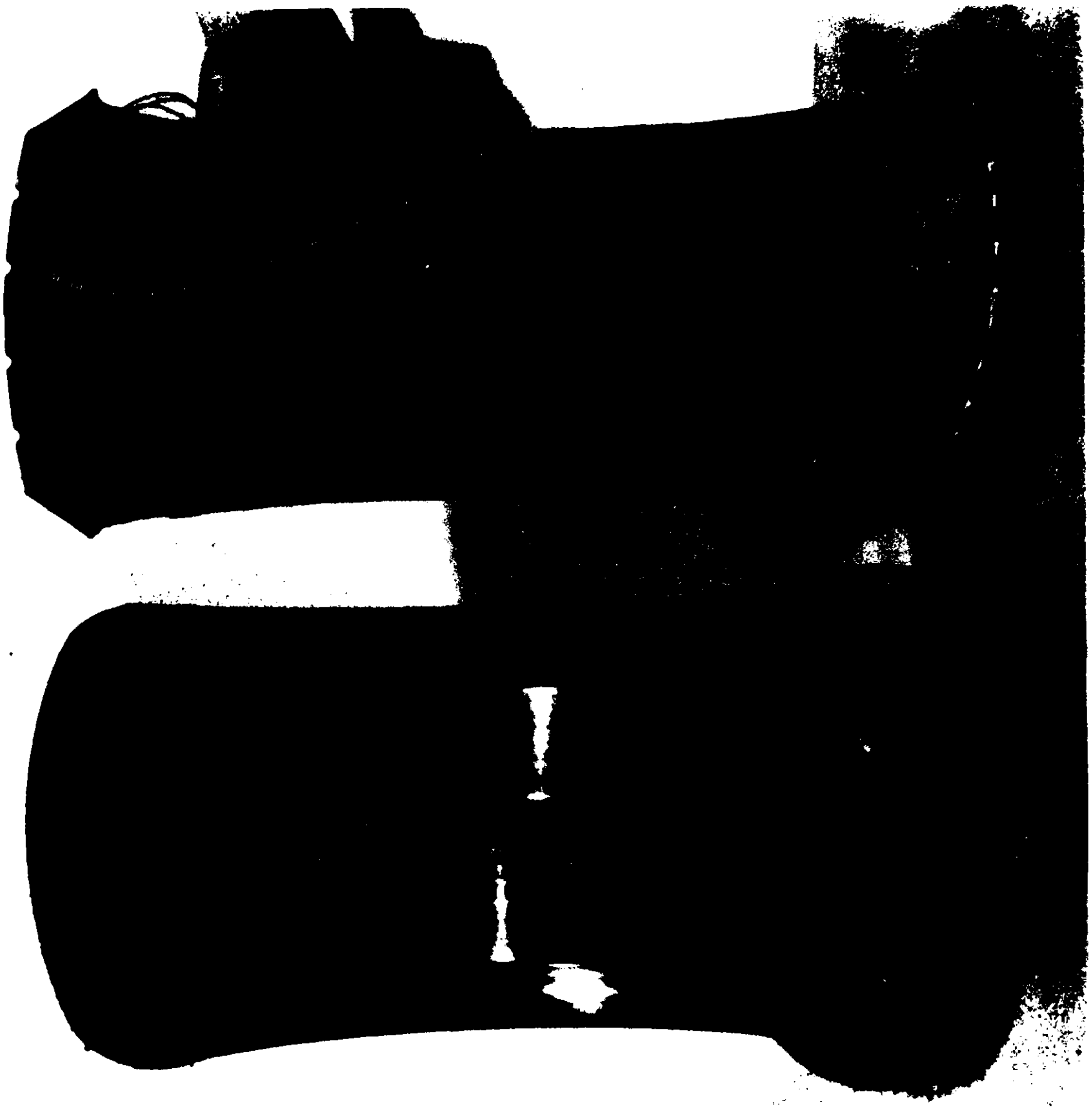


Figure 6. 7.00-8 Two-Piece Cast Tire (Carcass & Belt)

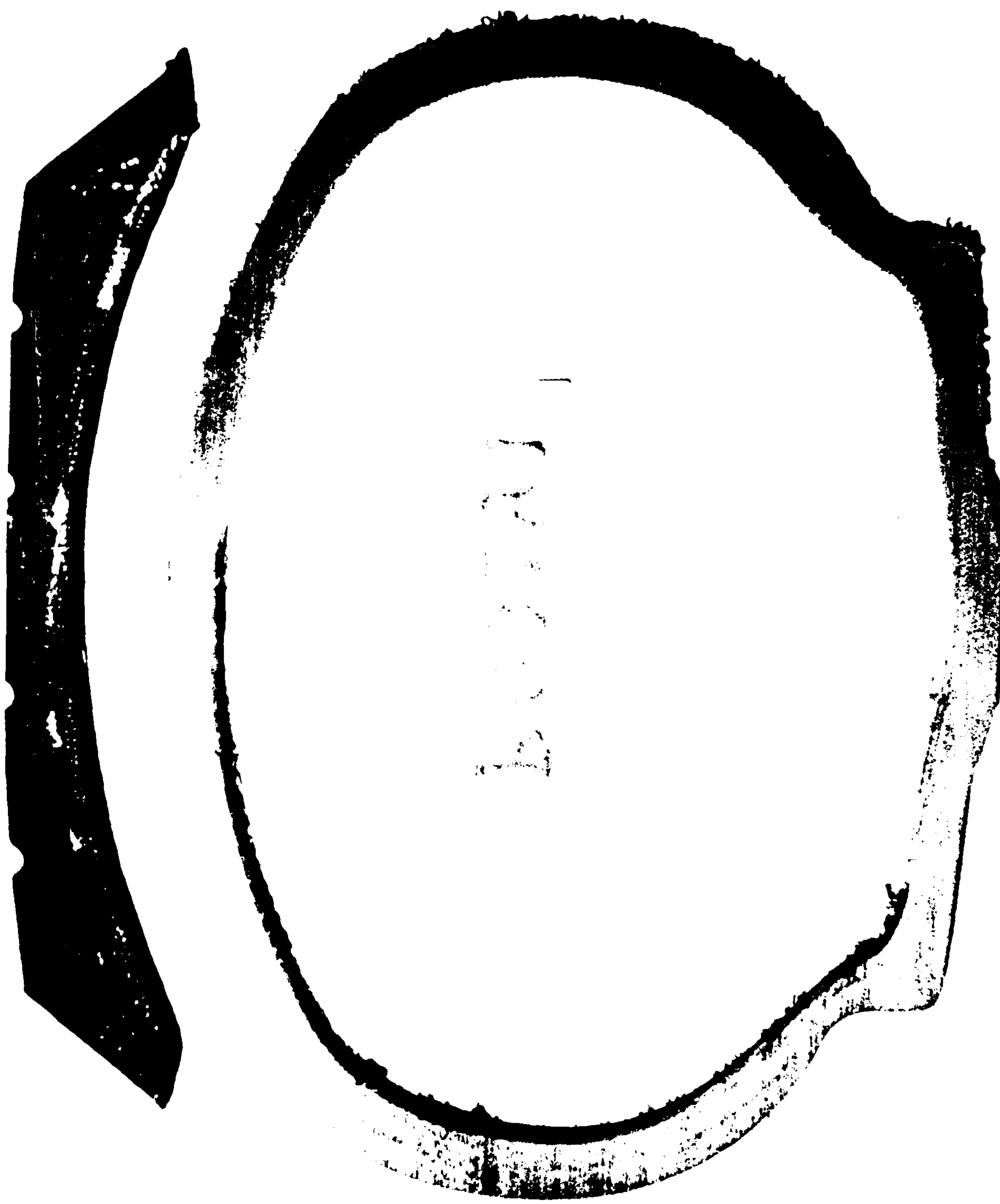


Figure 7. 7.00-8 Two-Piece Cast Tire (Carcass & Belt Section)

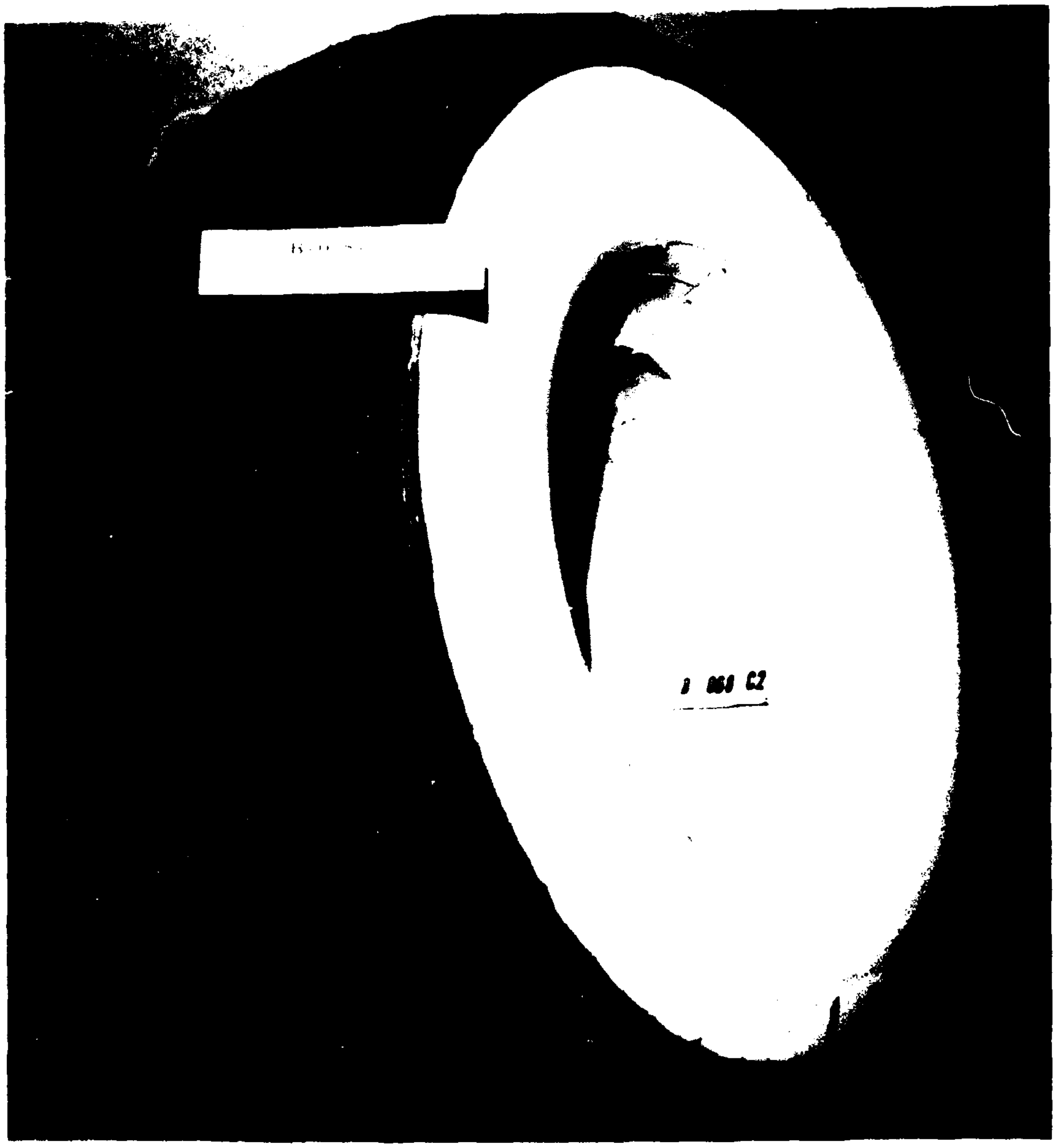


Figure [illegible]. 7.00-8 Integral Cast Tire

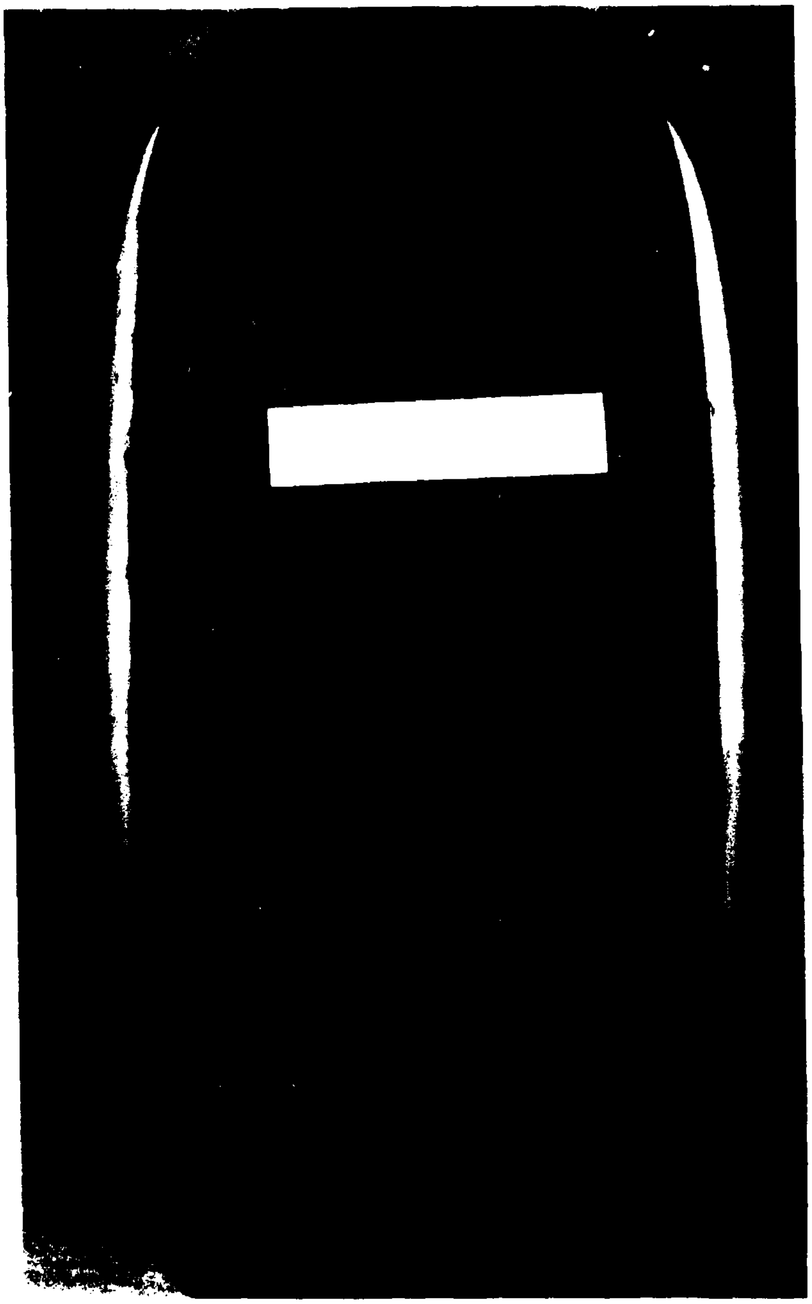


Figure 9. Integral Cast Tire (Tread)

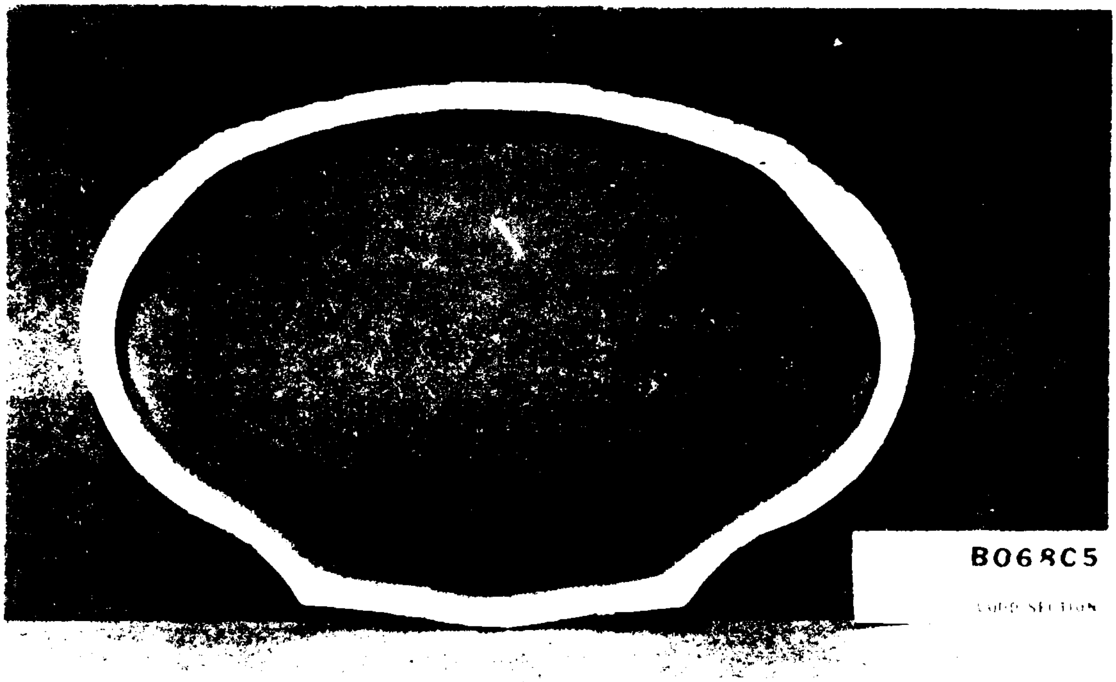


Figure 10. Integral Cast Tire (Section)

Figure 11. Baseline Bias Tire (7.00-8/16 PR)

Figure 12. Baseline Bias Tire-Section (7.00-8/16 PR)

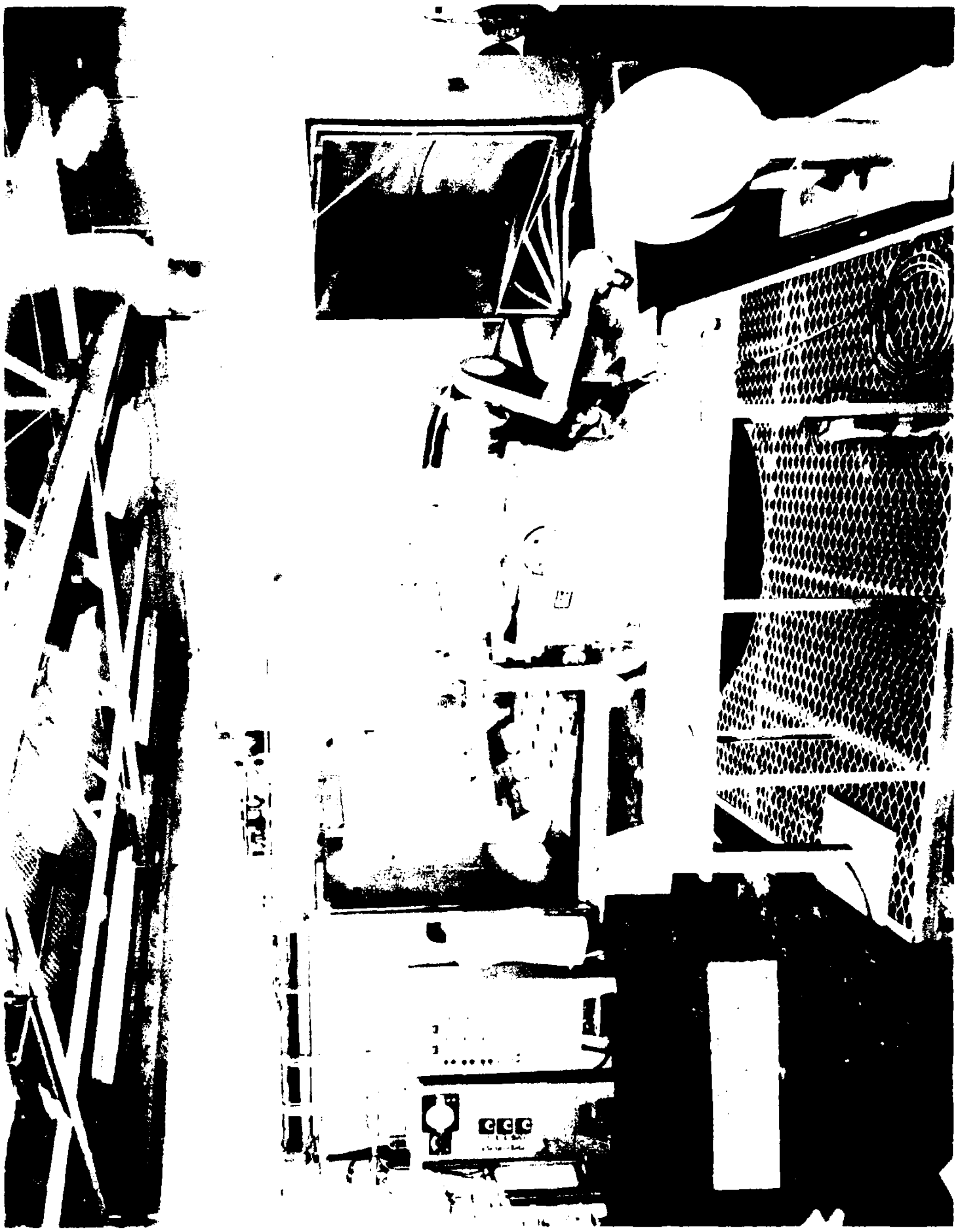


Figure 13. Rotational Molding Machine

Figure 14. Rotational Mold Fixture (Spider)

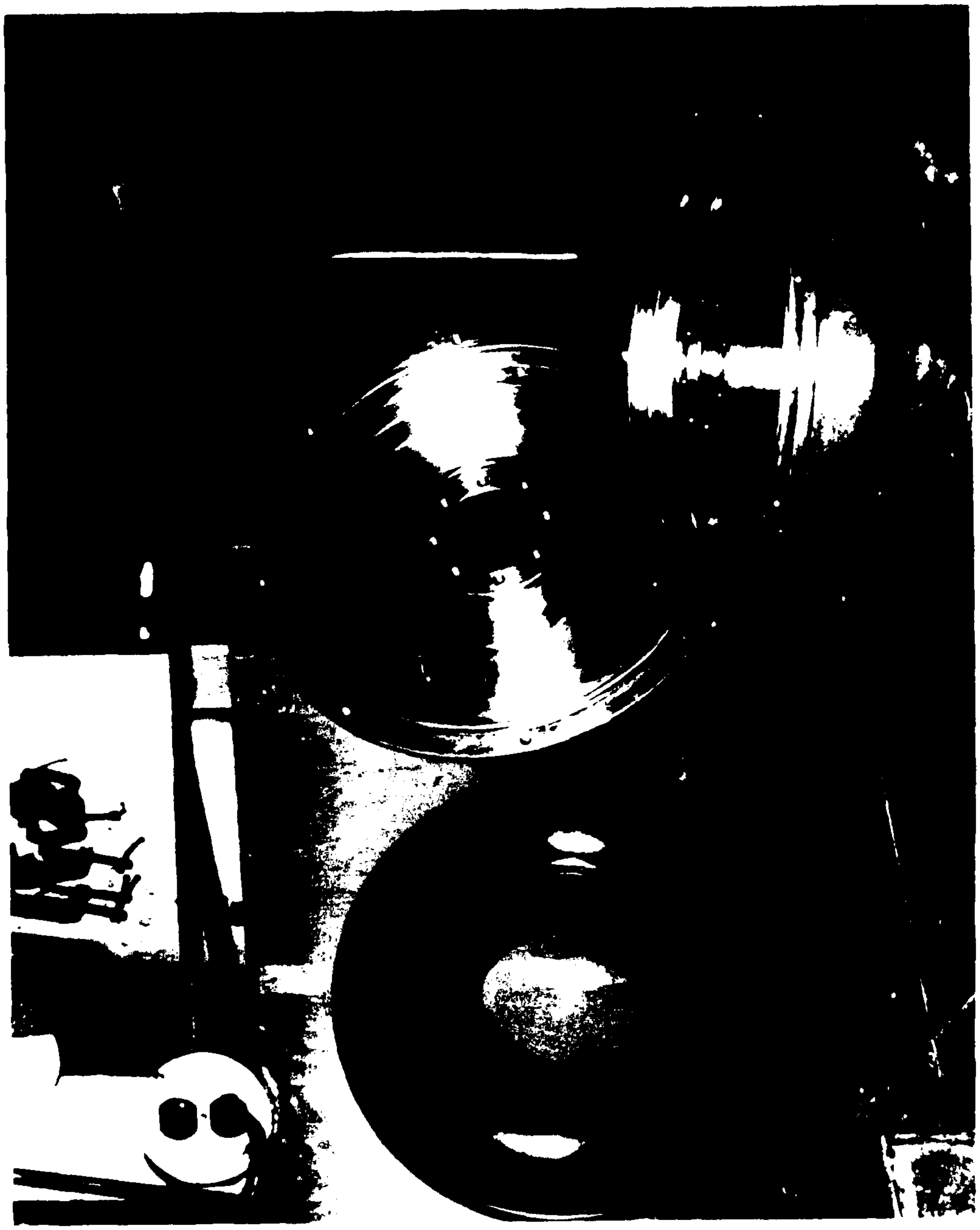


Figure 15. One-Piece Cast Tire Mold

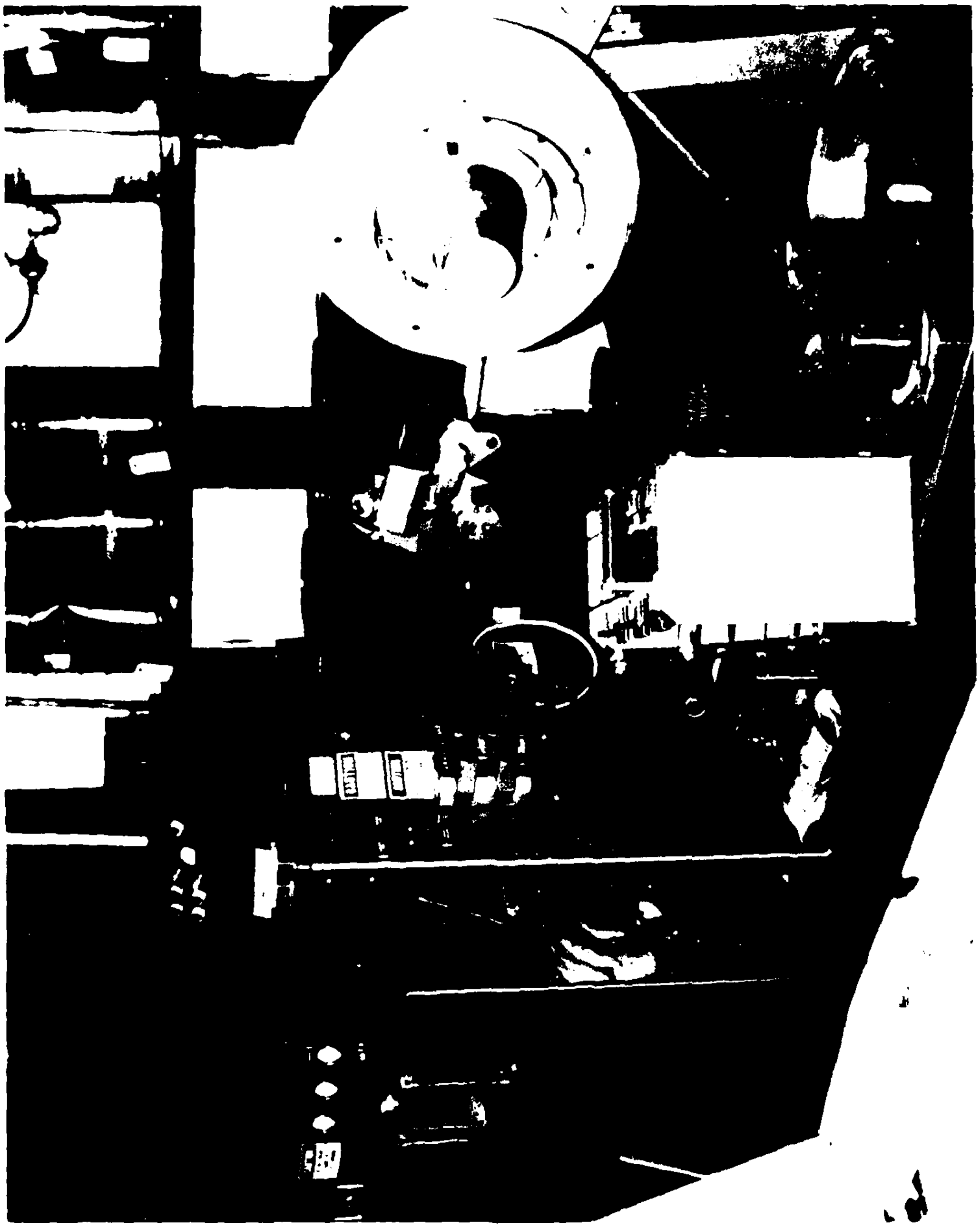


Figure 16. AMF Orbitread Machine

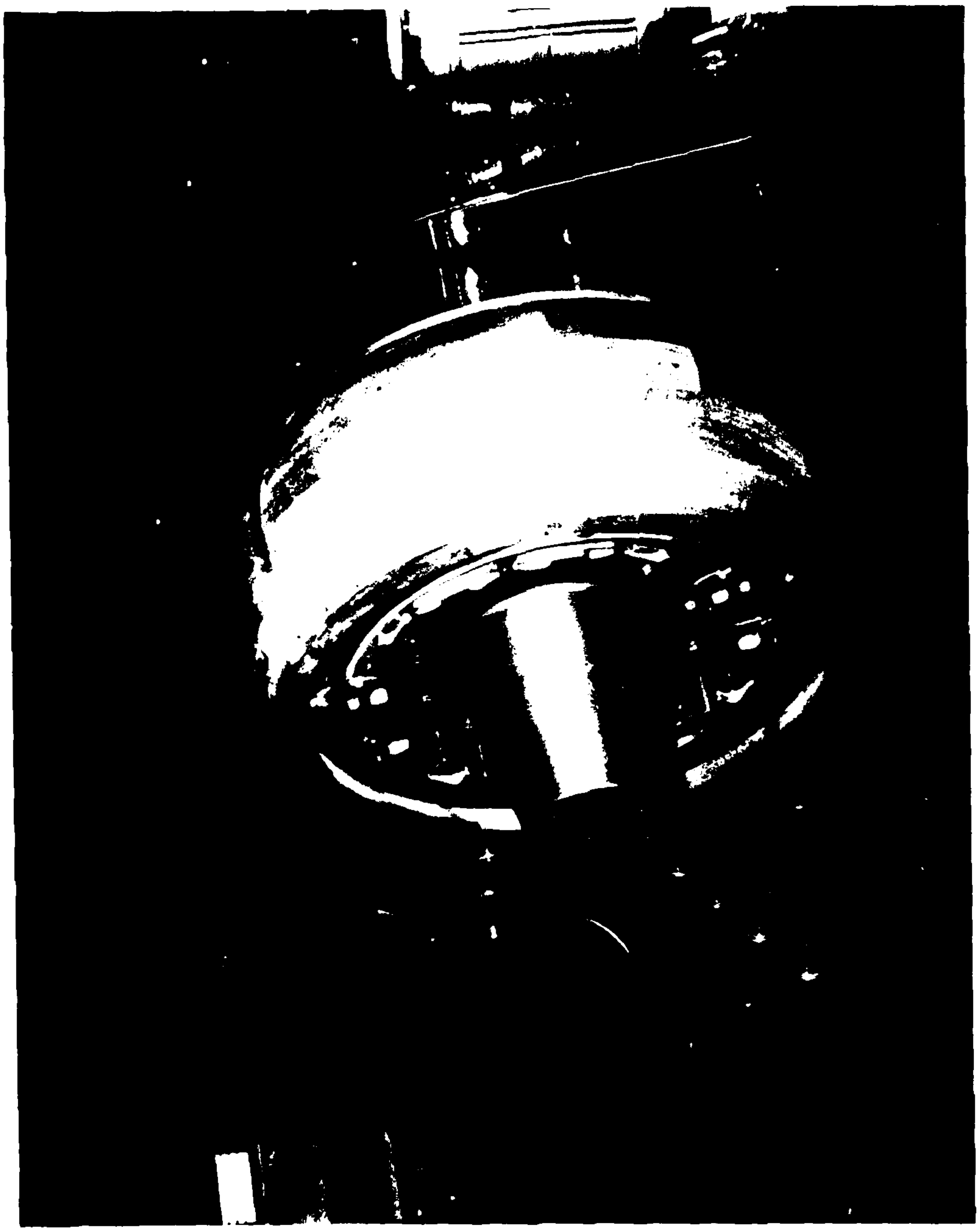


Figure 17. Tread Belt Mandrel & Mold

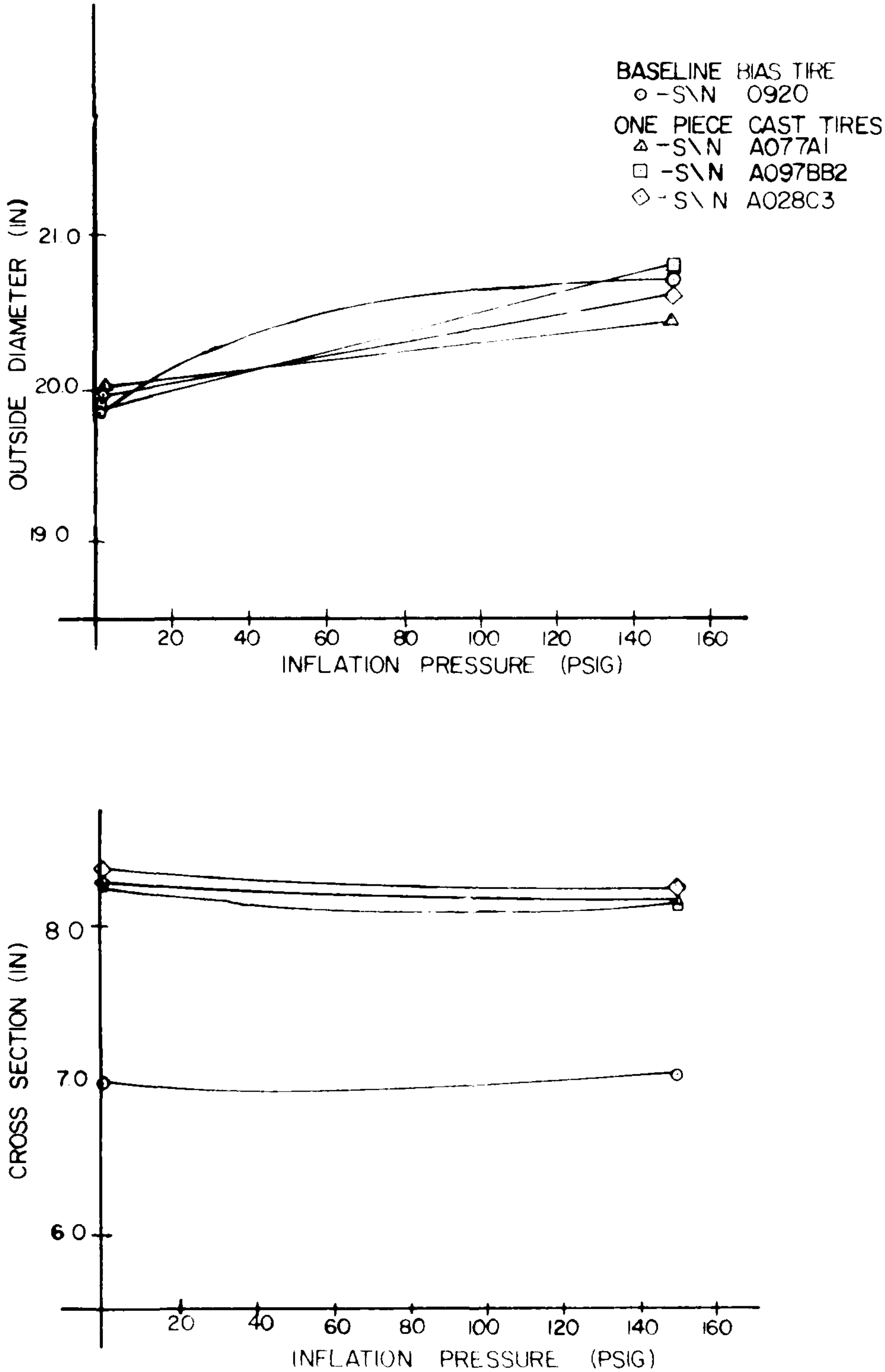


Figure 18. Static Growth Measurements - One-Piece Cast Tires

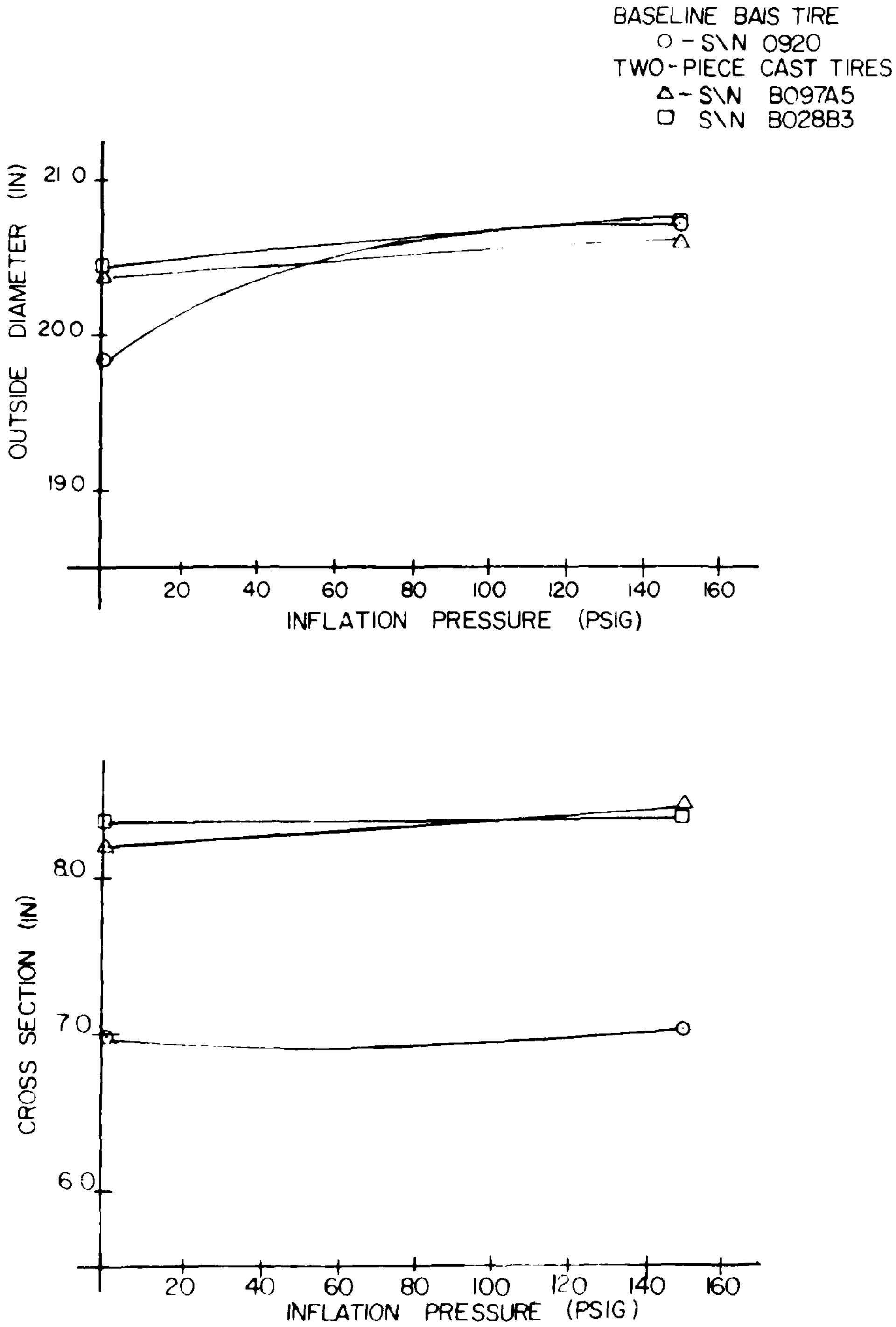


Figure 19. Static Growth Measurements - Two-Piece Cast Tires

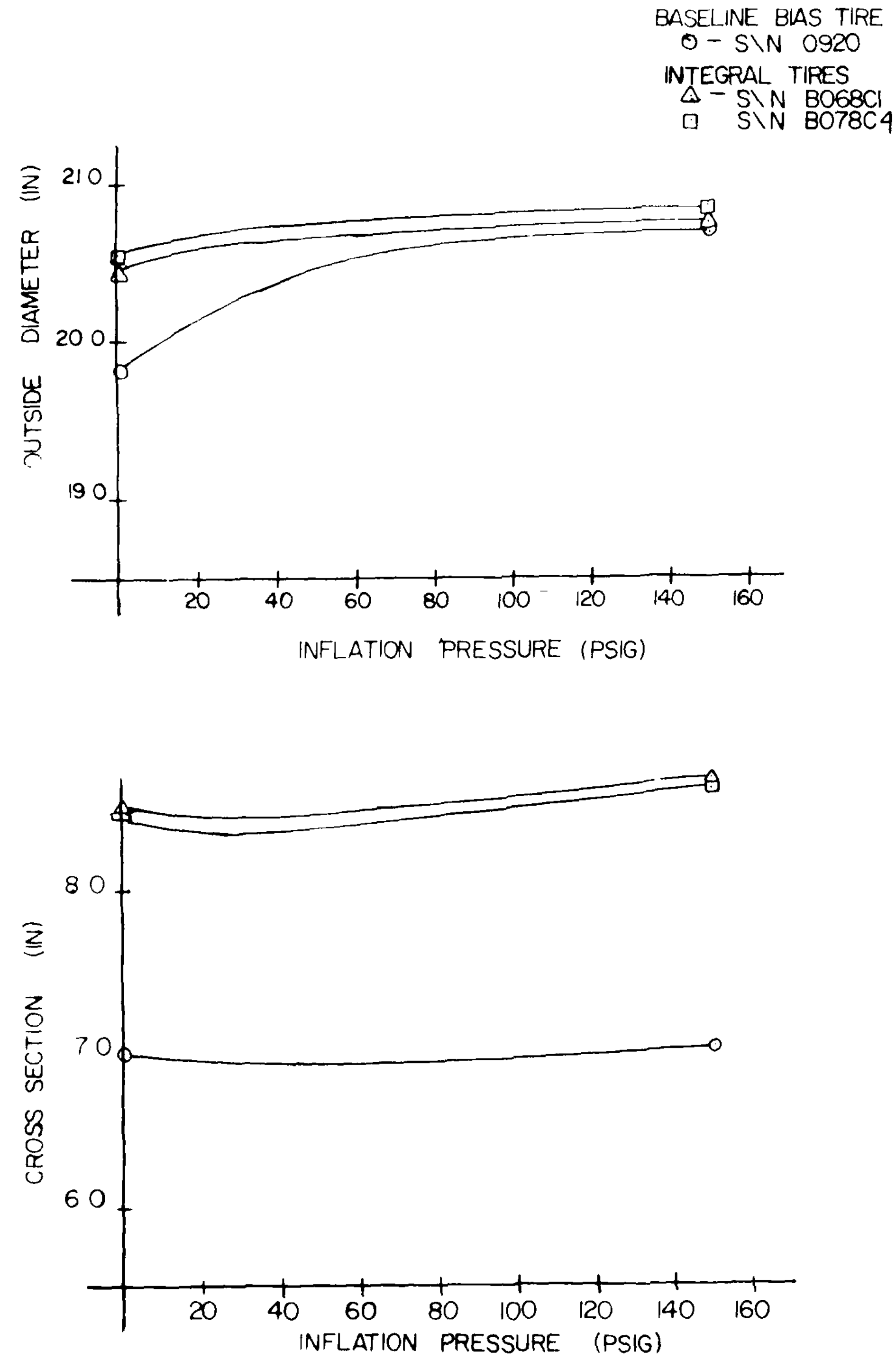


Figure 20. Static Growth Measurements - Integral Tires

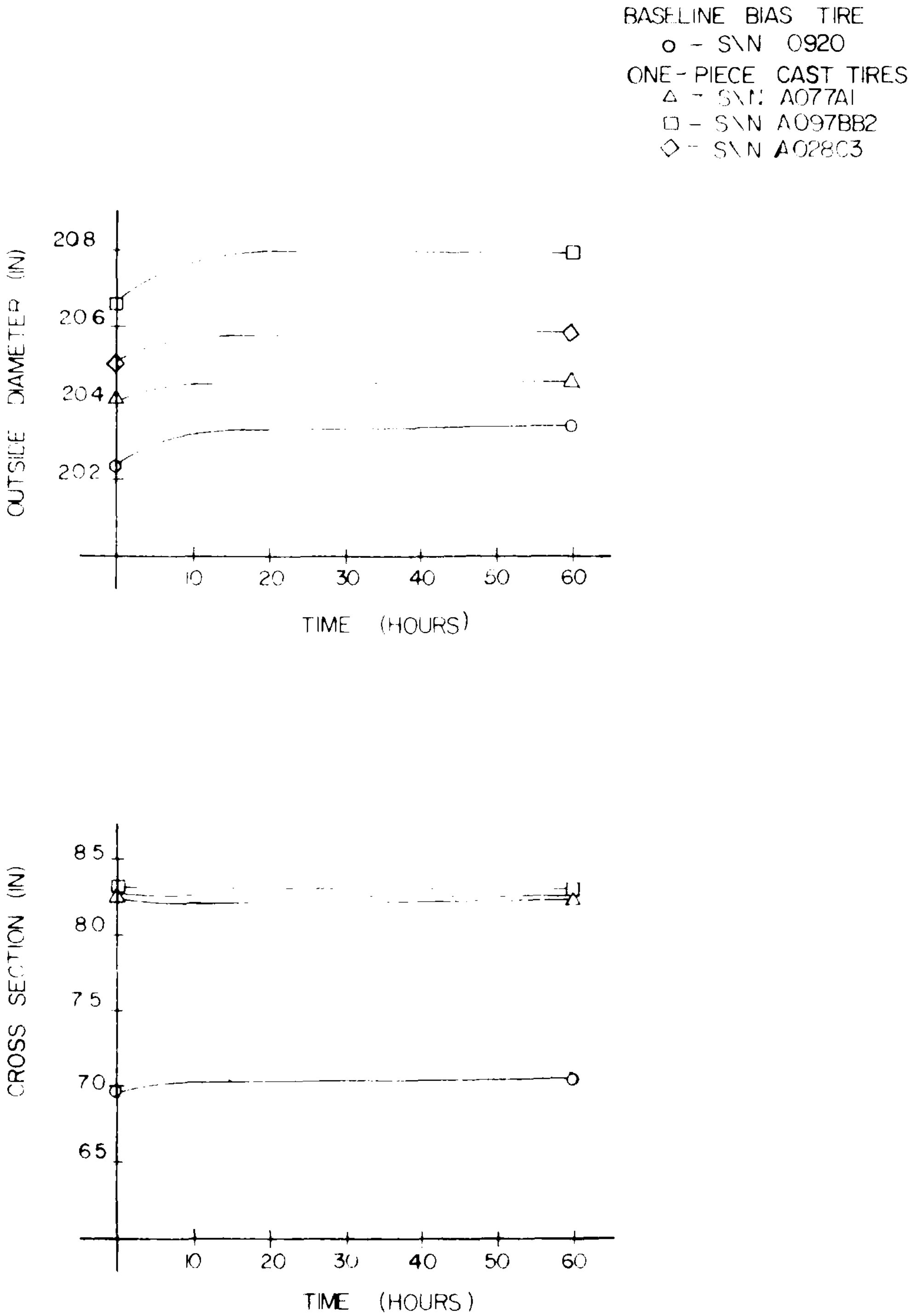


Figure 21. Dimensional Stability Data @ 125 (PSIG) Inflation Pressure - One-Piece Cast Tires

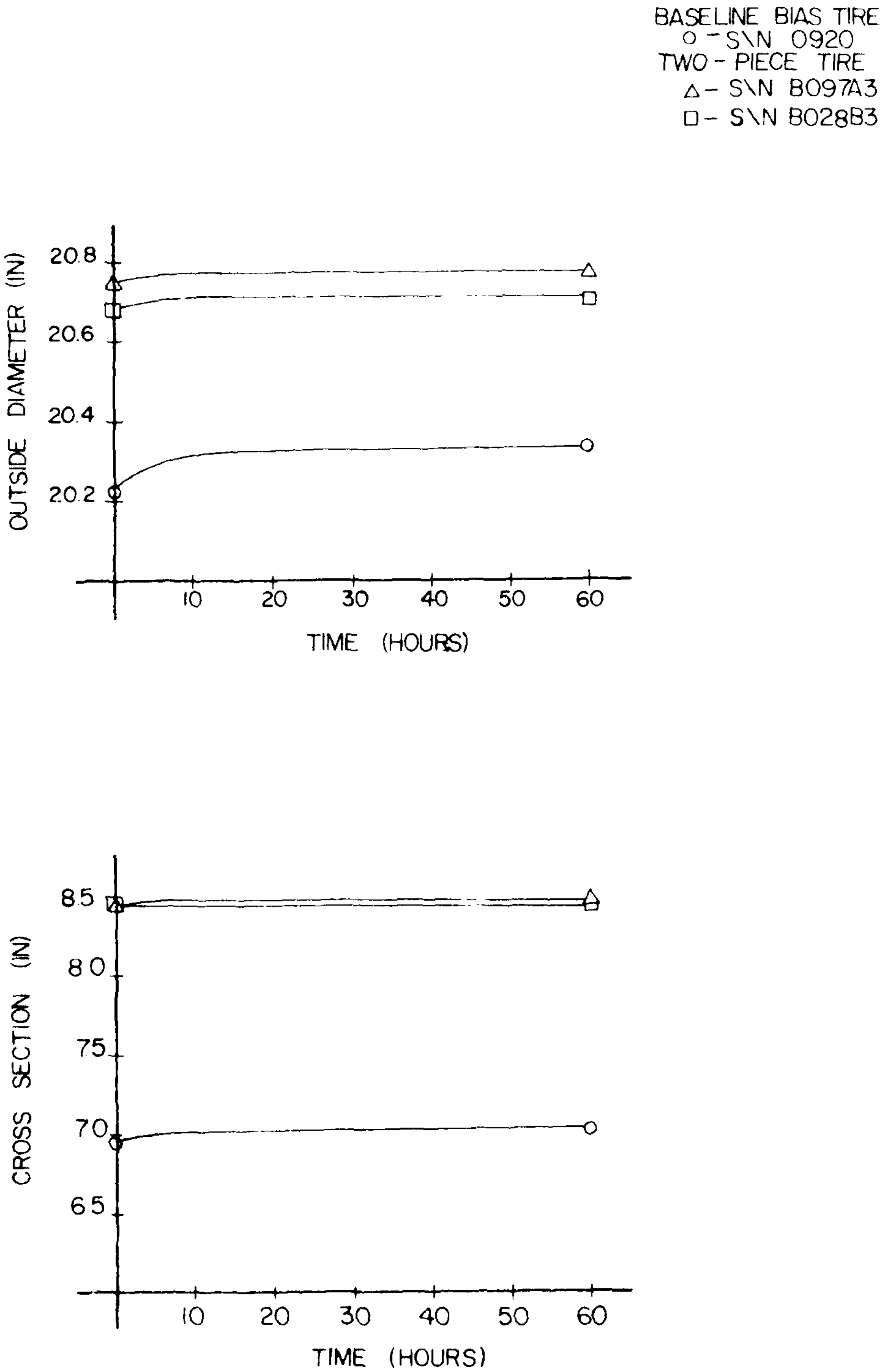


Figure 22. Dimensional Stability Data @ 125 (PSIG) Inflation Pressure - Two-Piece Tire

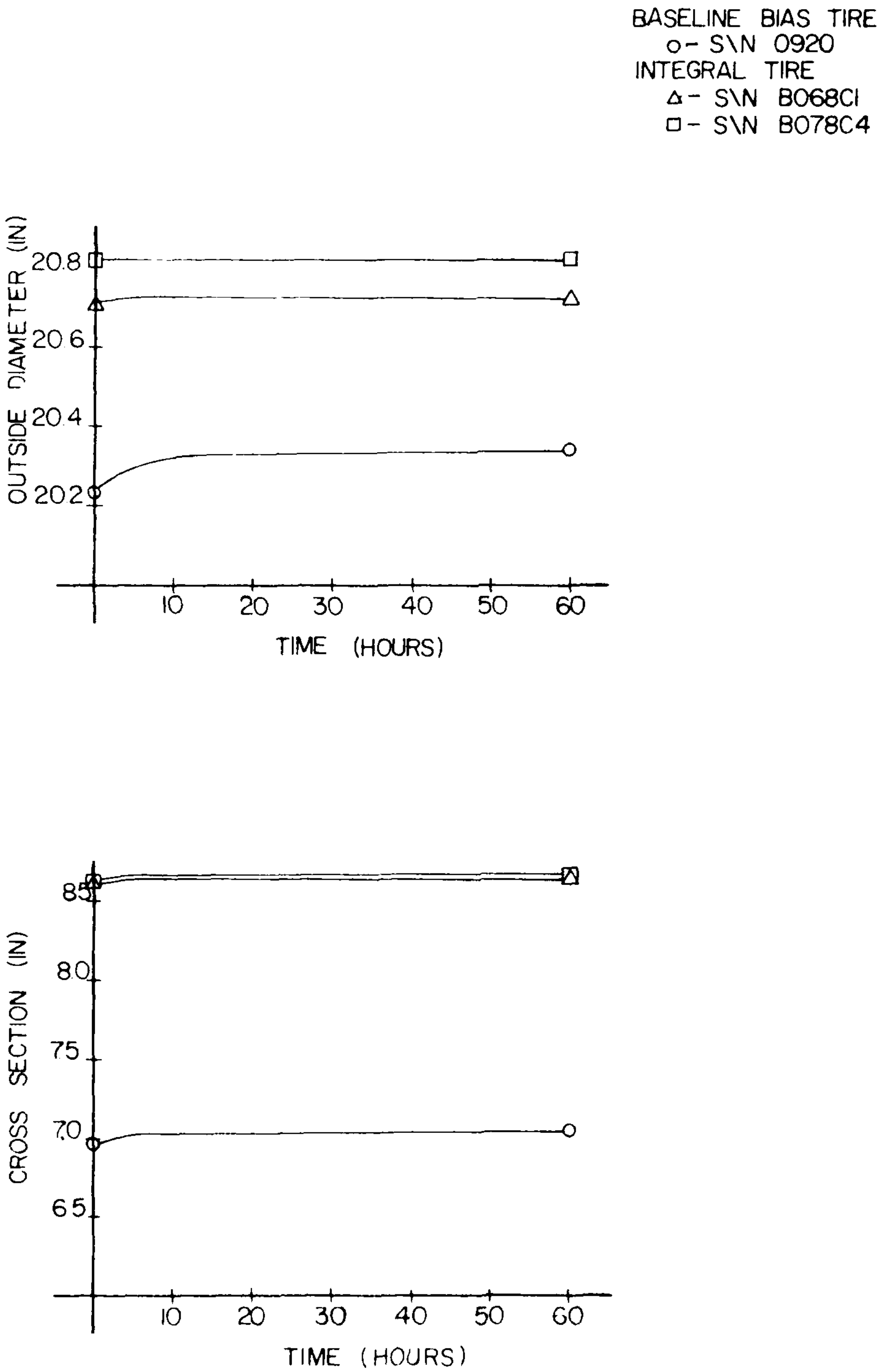


Figure 23. Dimensional Stability Data @ 125 (PSIG) Inflation Pressure - Integral Tire

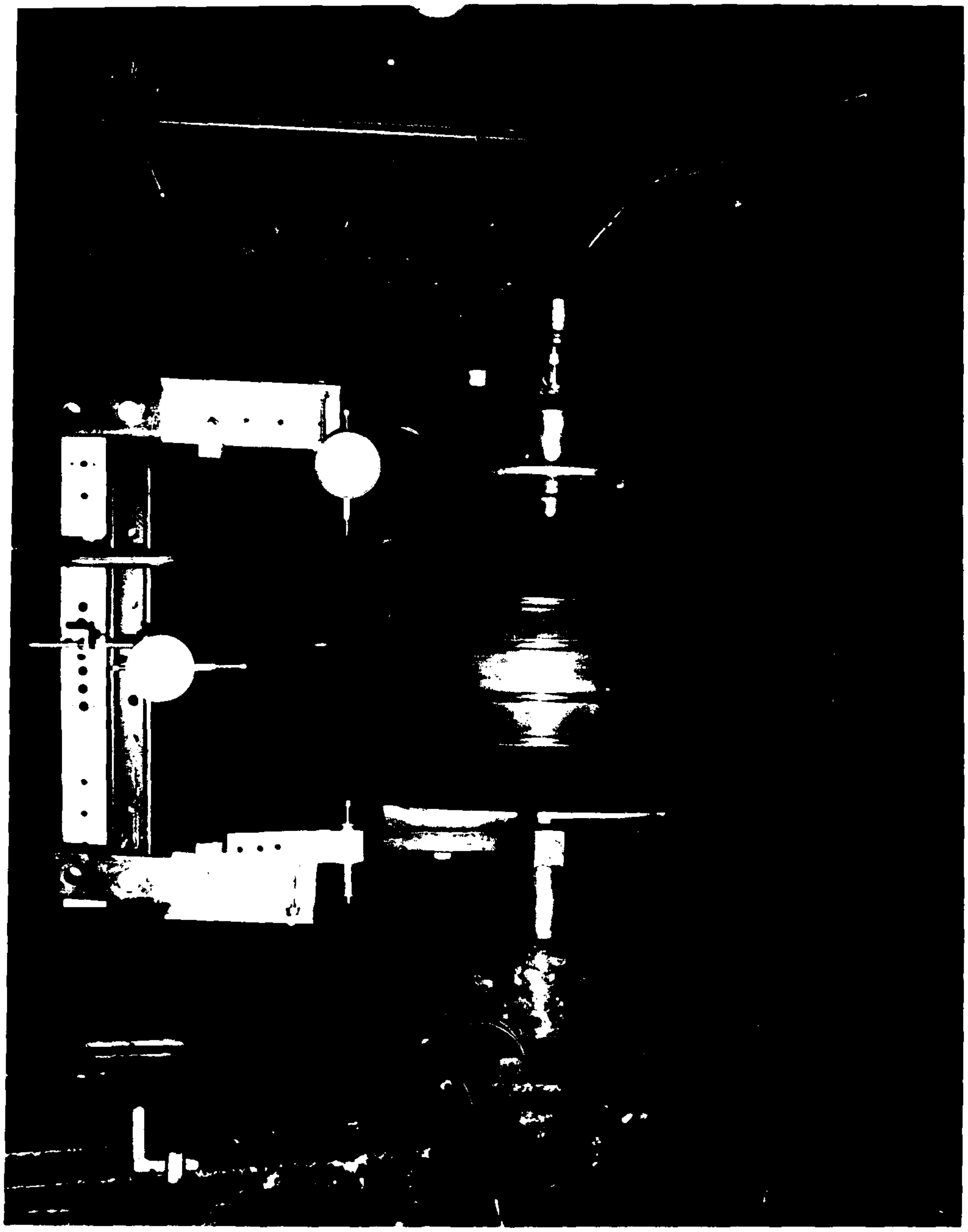


Figure 24. Dimensional Growth Tests (One-Piece Cast Tire)

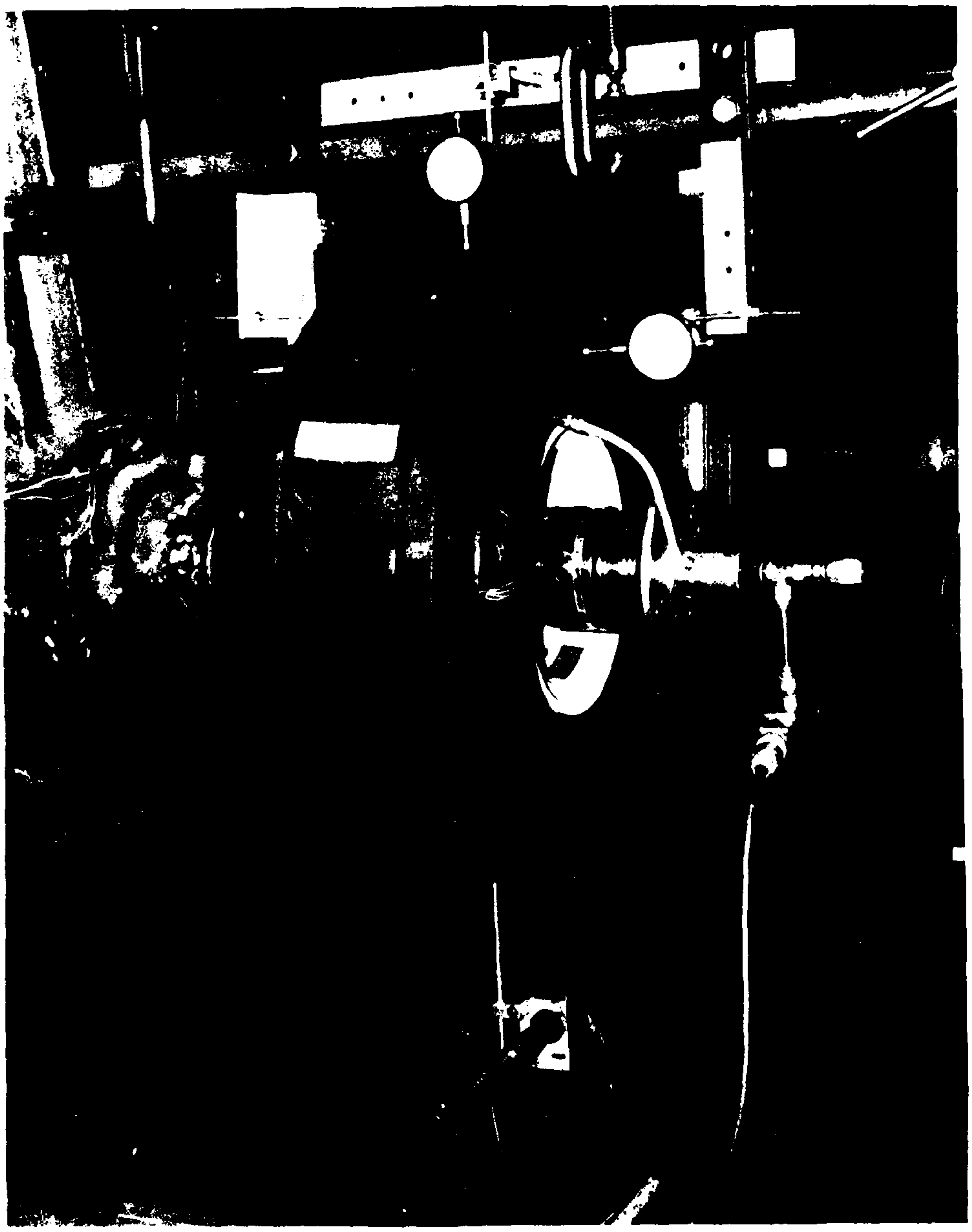


Figure 25. Dimensional Growth Tests (Two-Piece Cast Tire)

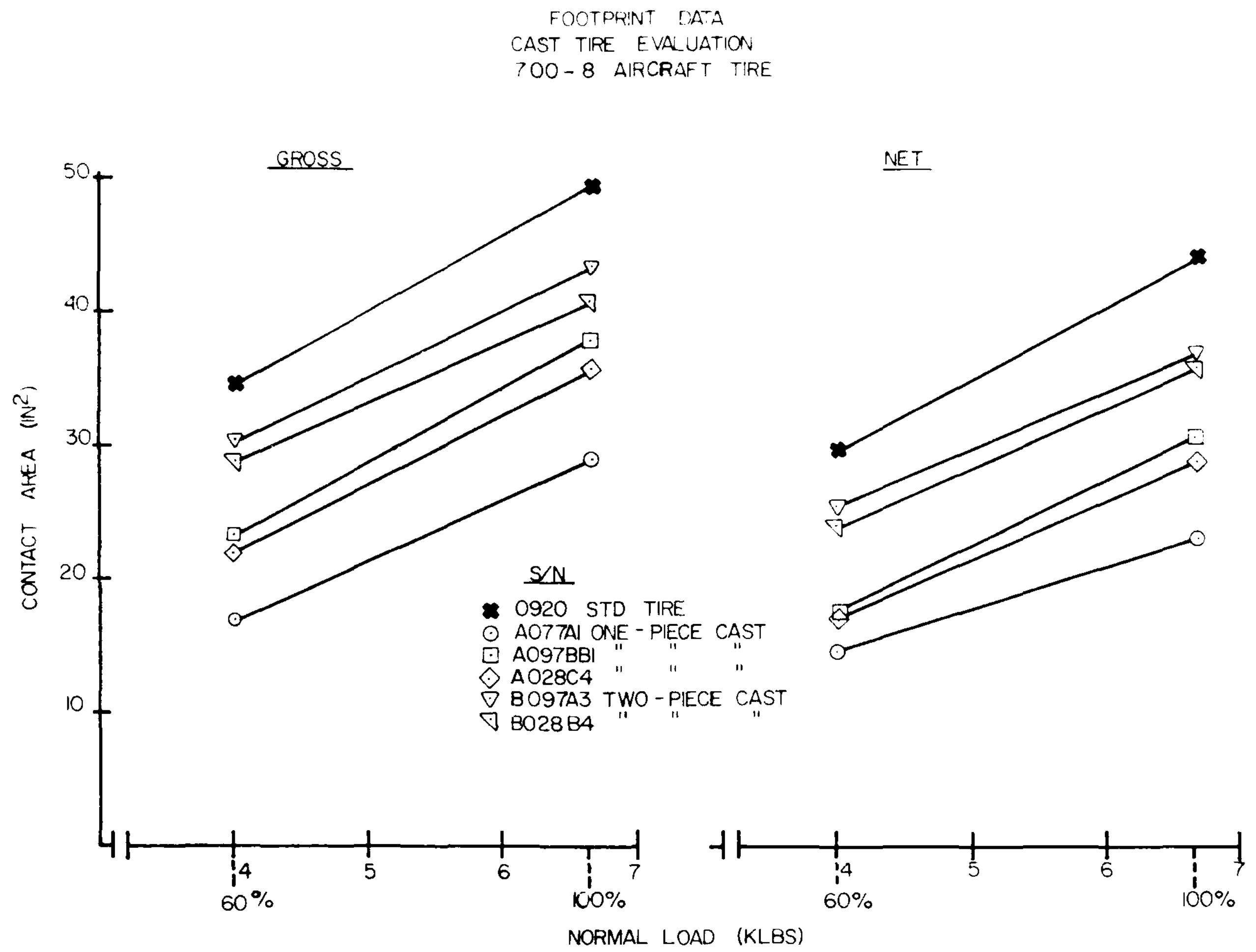


Figure 26. Contact Area Vs Normal Load

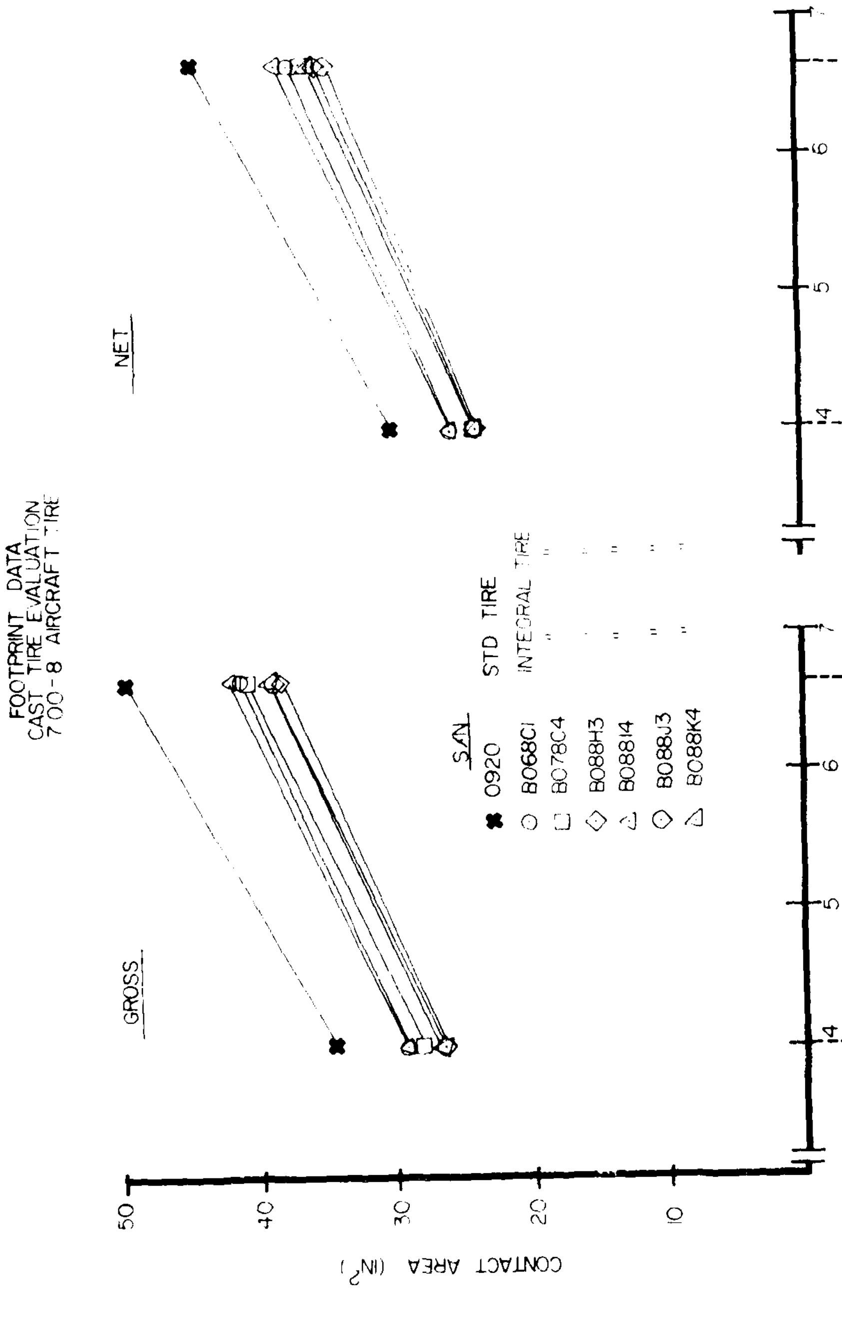


Figure 27. Contact Area Vs Normal Load

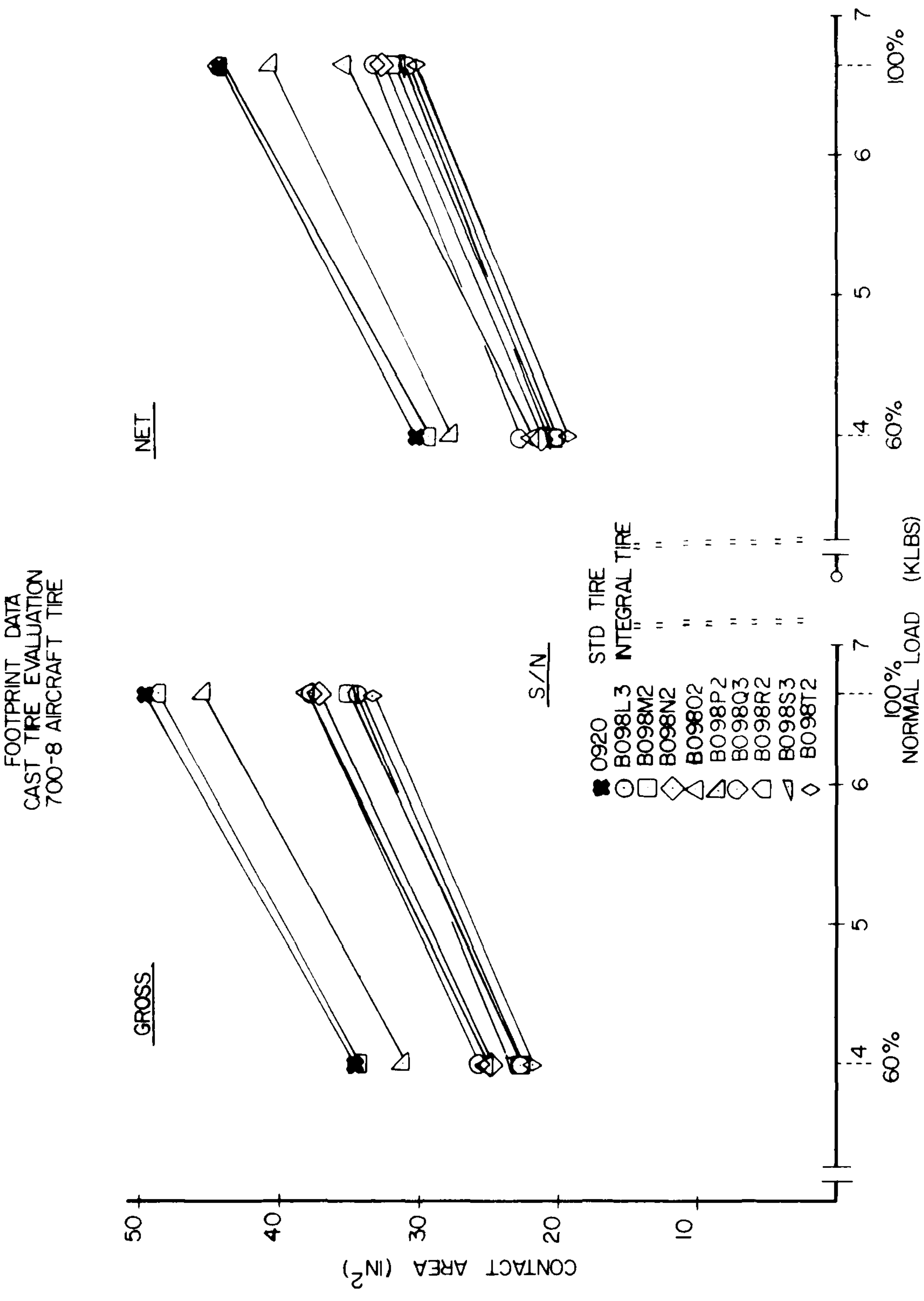


Figure 28. Contact Area Vs Normal Load

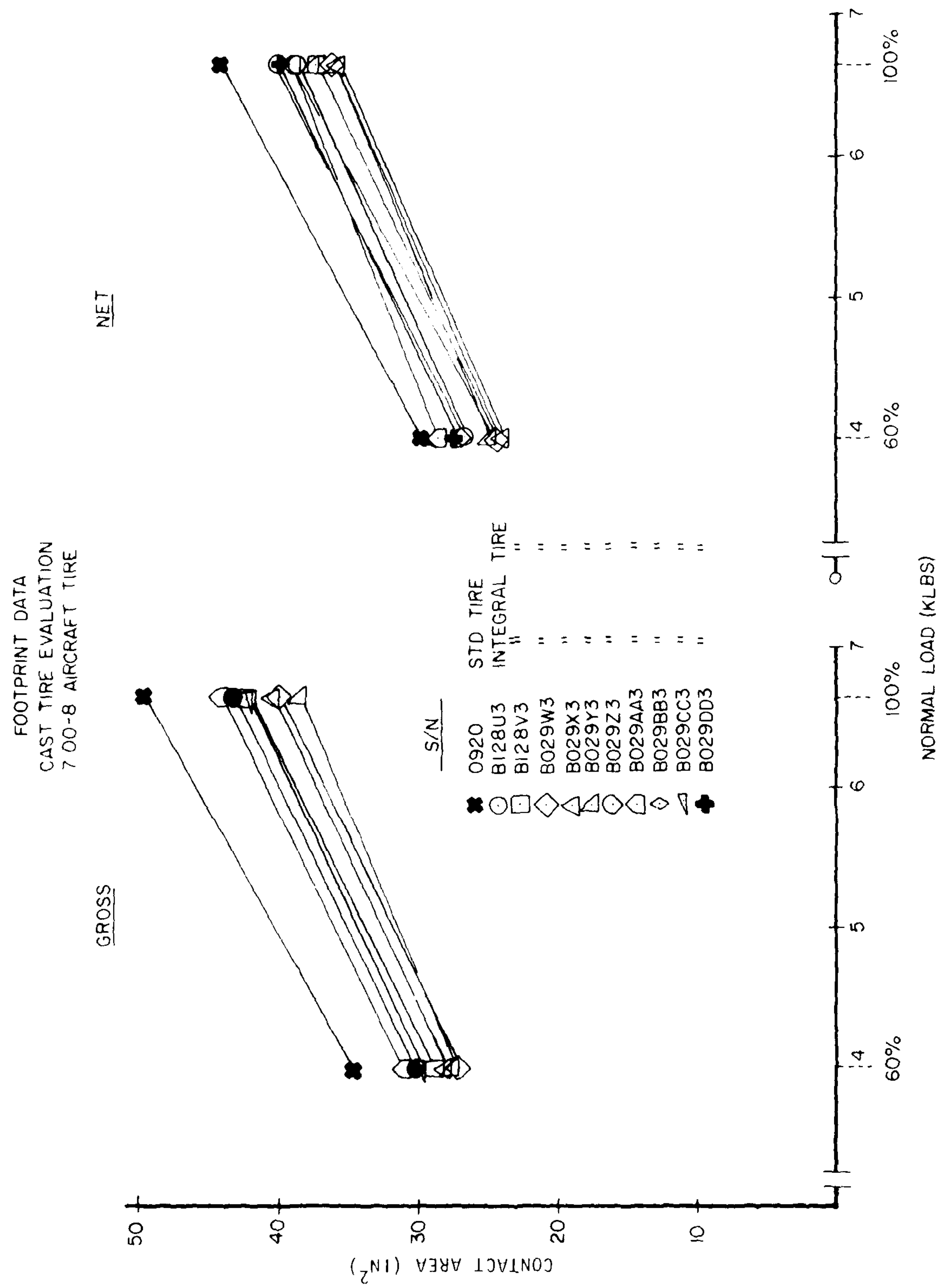


Figure 29. Contact Area Vs Normal Load

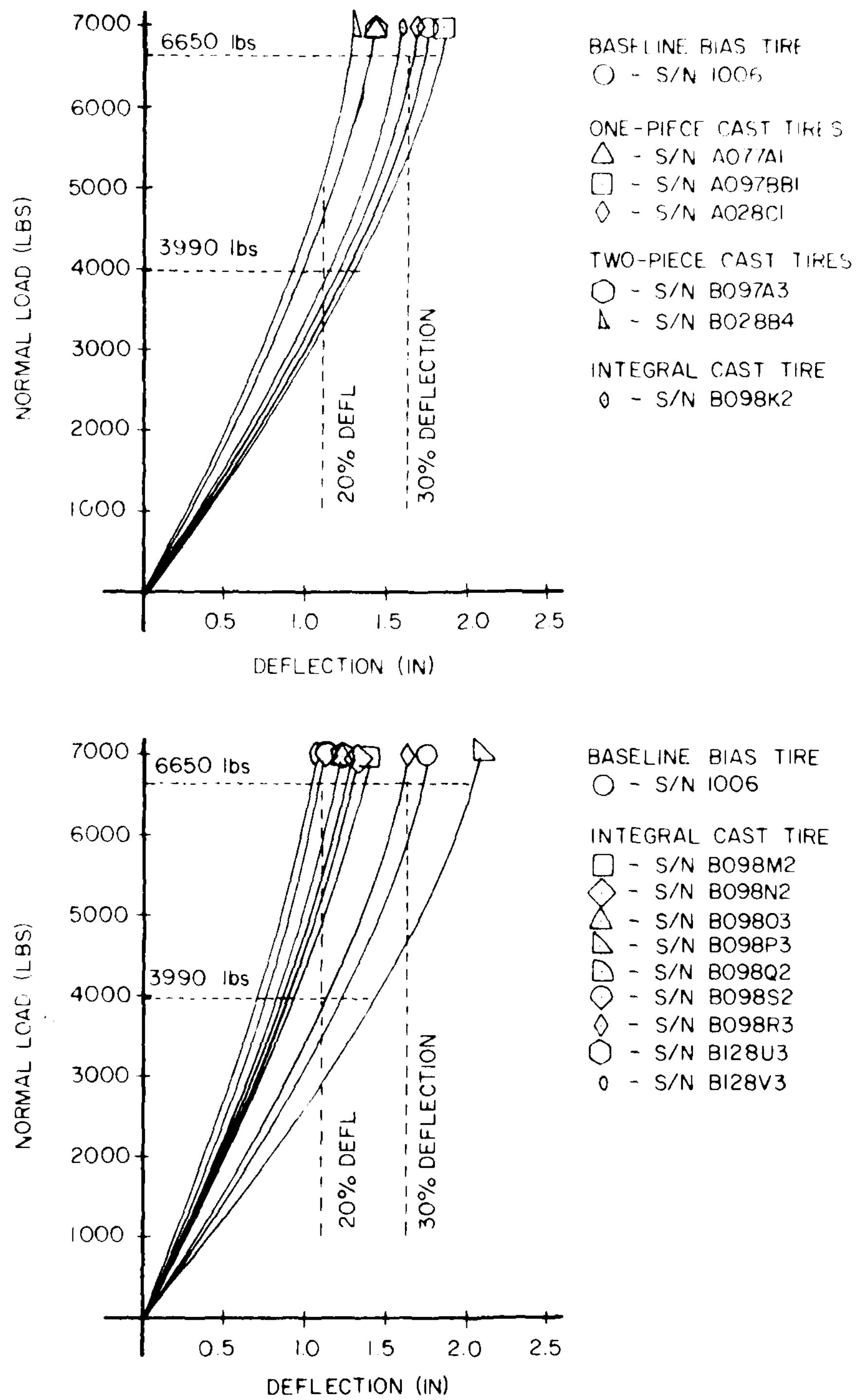


Figure 30. Vertical Load Vs Deflection @ 125 PSIG

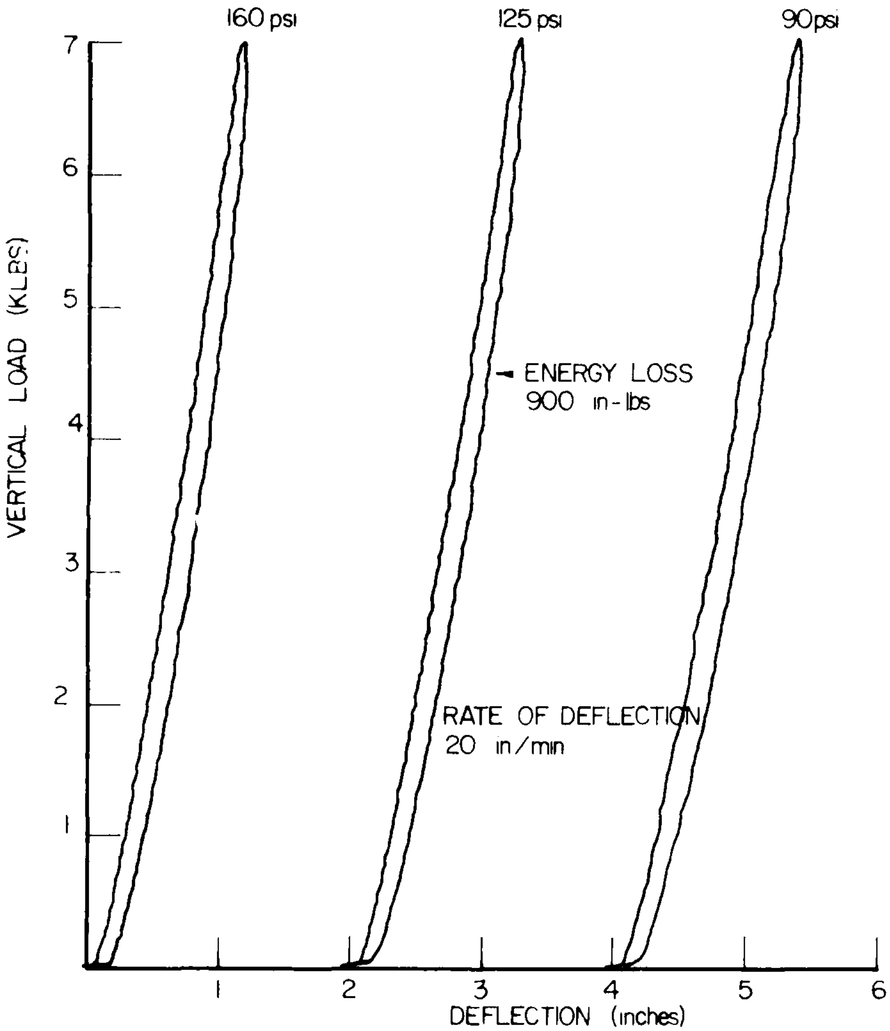


Figure 31. Vertical Load Vs Vertical Deflection, Integral Tire S/N 612803

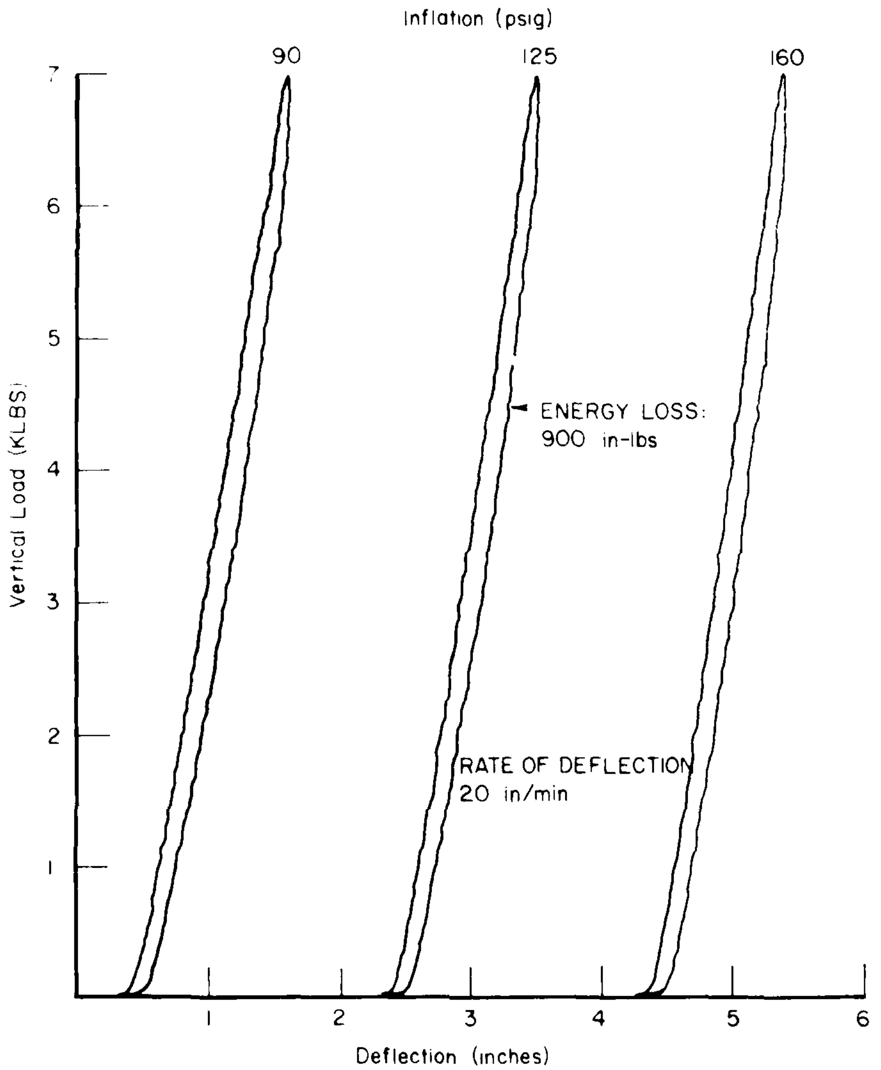


Figure 32. Vertical Load Vs Vertical Deflection, Integral Tire S/N B128V3

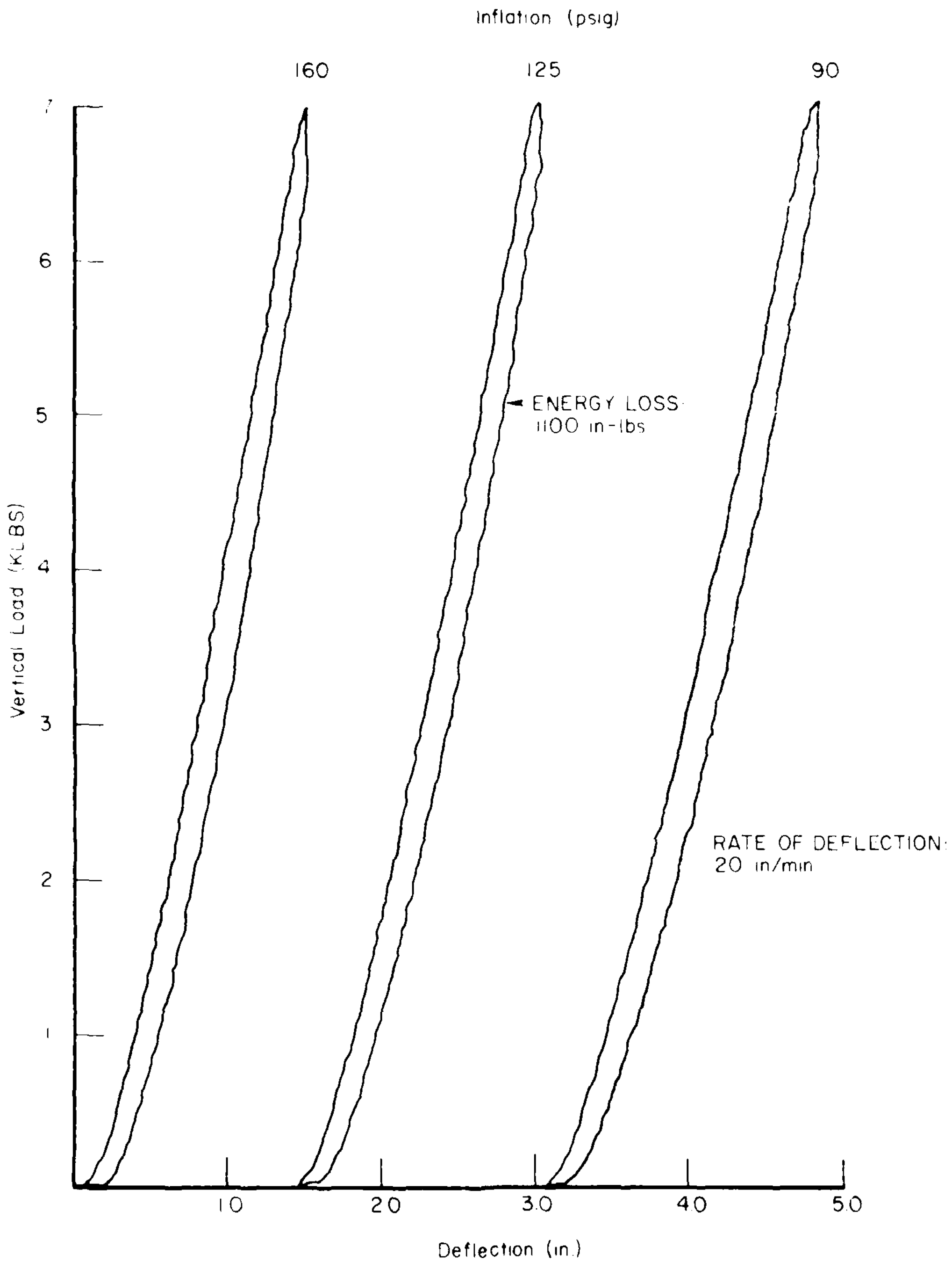


Figure 33. Vertical Load Vs Vertical Deflection, Integral Tire S/N B088I2

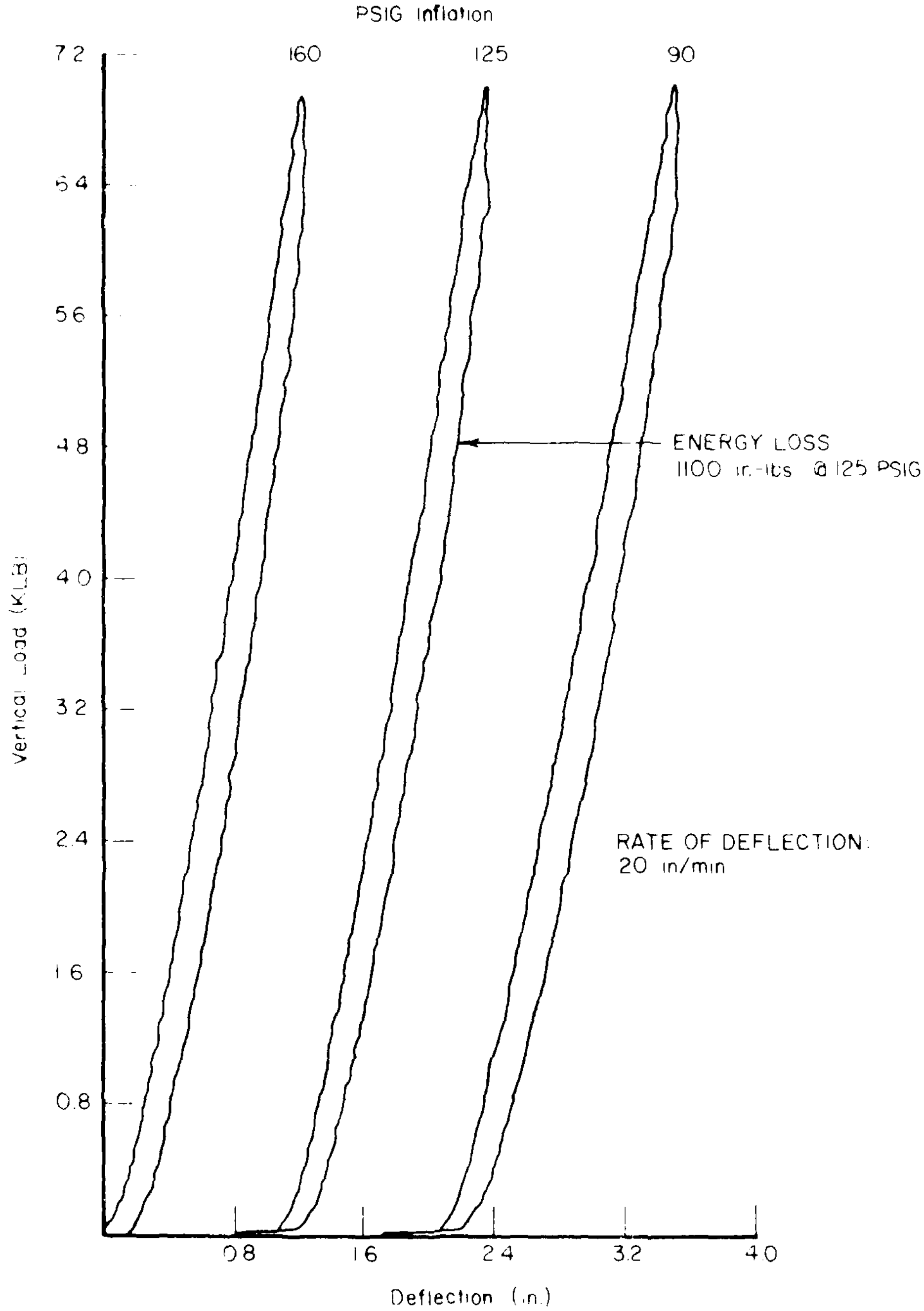


Figure 34. Vertical Load Vs Vertical Deflection, Integral Tire S/N B098L2

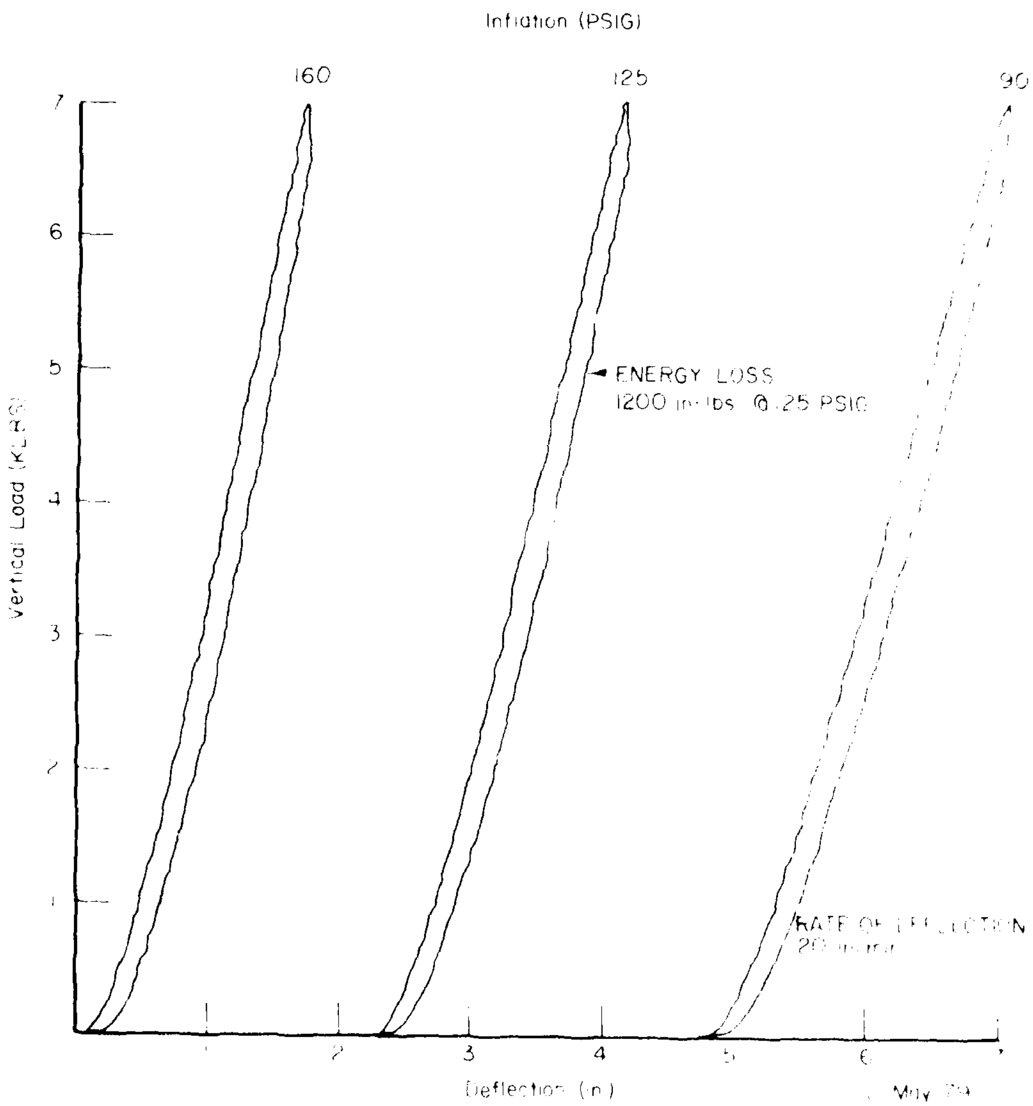
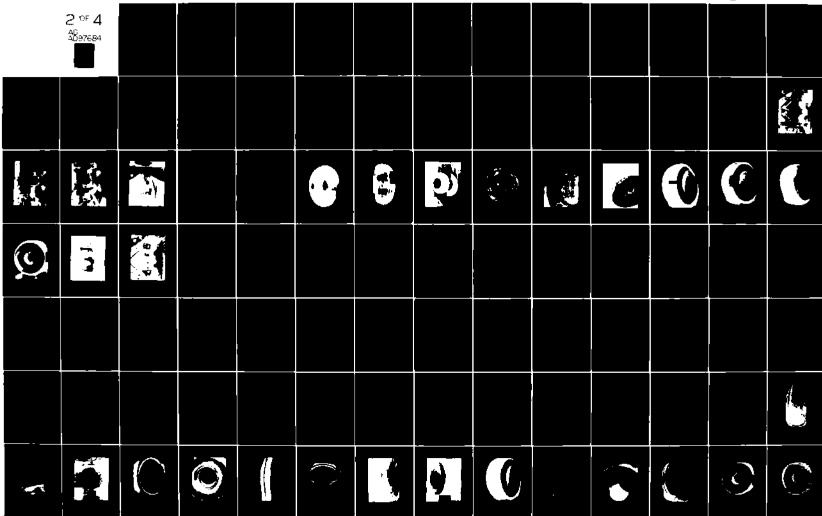


Figure 35. Vertical Load V Vertical Deflection, Baseline [illegible] Tire S/N 1006

AD-A097 684 AIR FORCE WRIGHT AERONAUTICAL LABS WRIGHT-PATTERSON AFB OH F/G 1/3
STATIC AND DYNAMIC EVALUATION OF A-37 CAST AND CAST CARCASS/INT--ETC(U)
NOV 80 P C ULRICH
UNCLASSIFIED AFWAL-TR-80-3055 NL

2 OF 4
AD
A097684



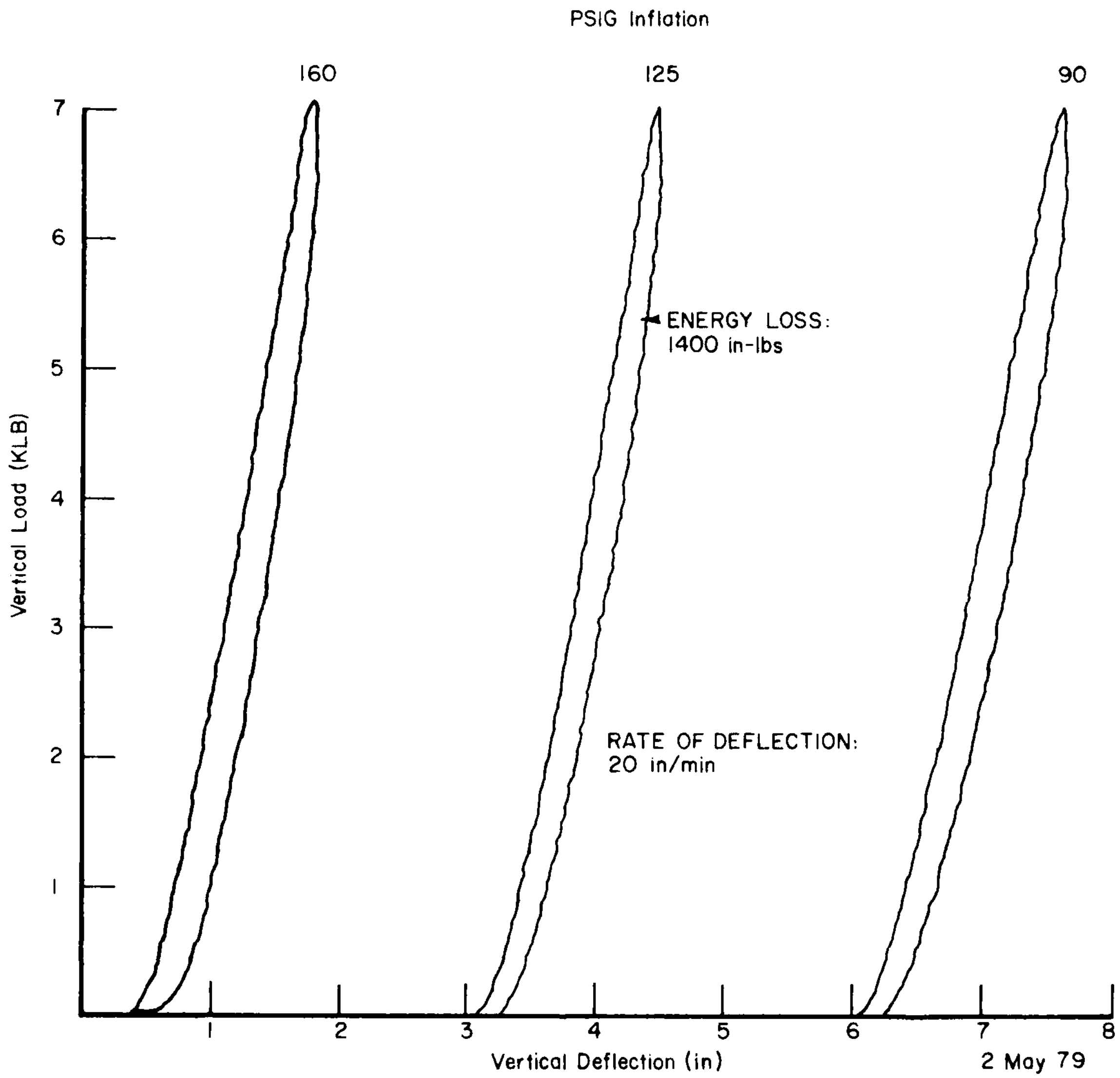


Figure 36. Vertical Load Vs Vertical Deflection, Integral Tire S/N B098M2

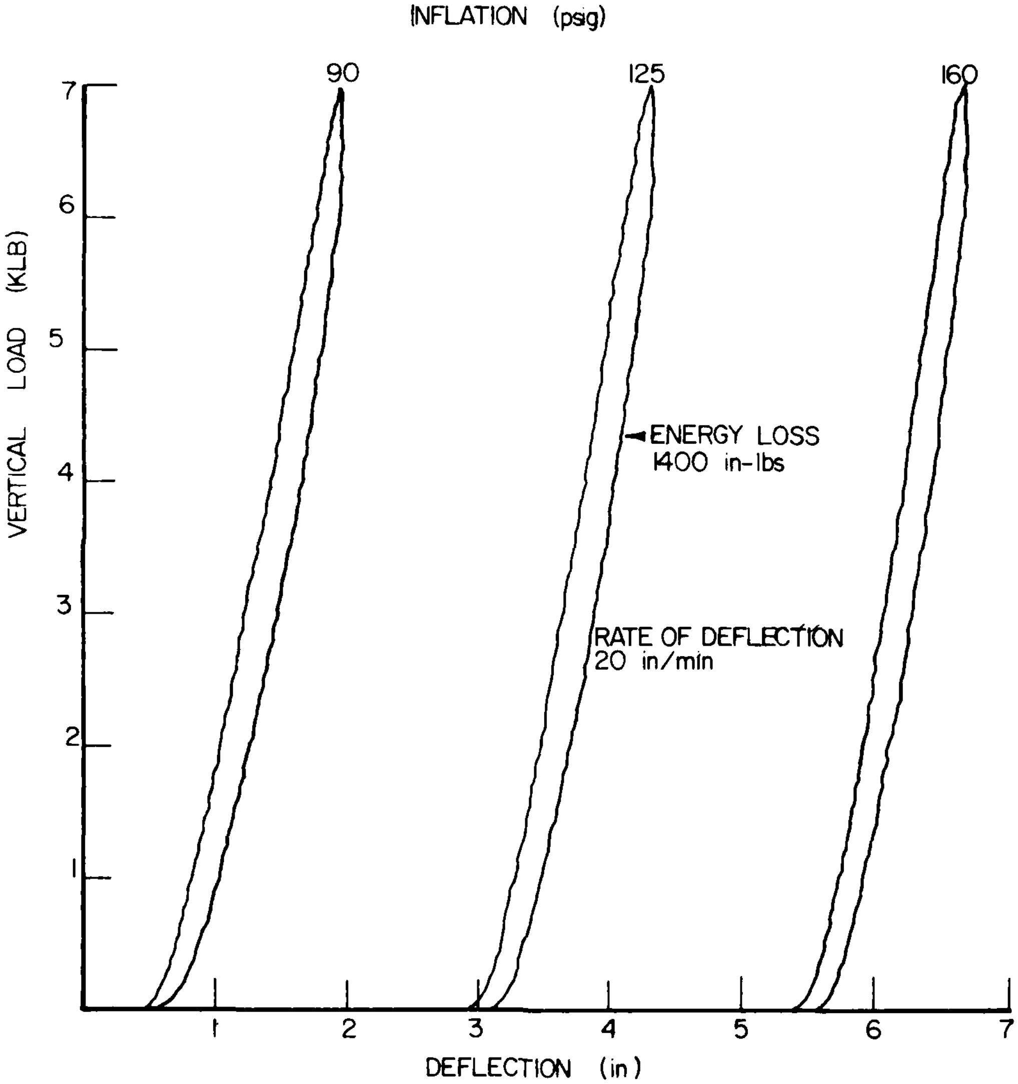


Figure 37. Vertical Load Vs Vertical Deflection, Integral Tire S/N B098N3

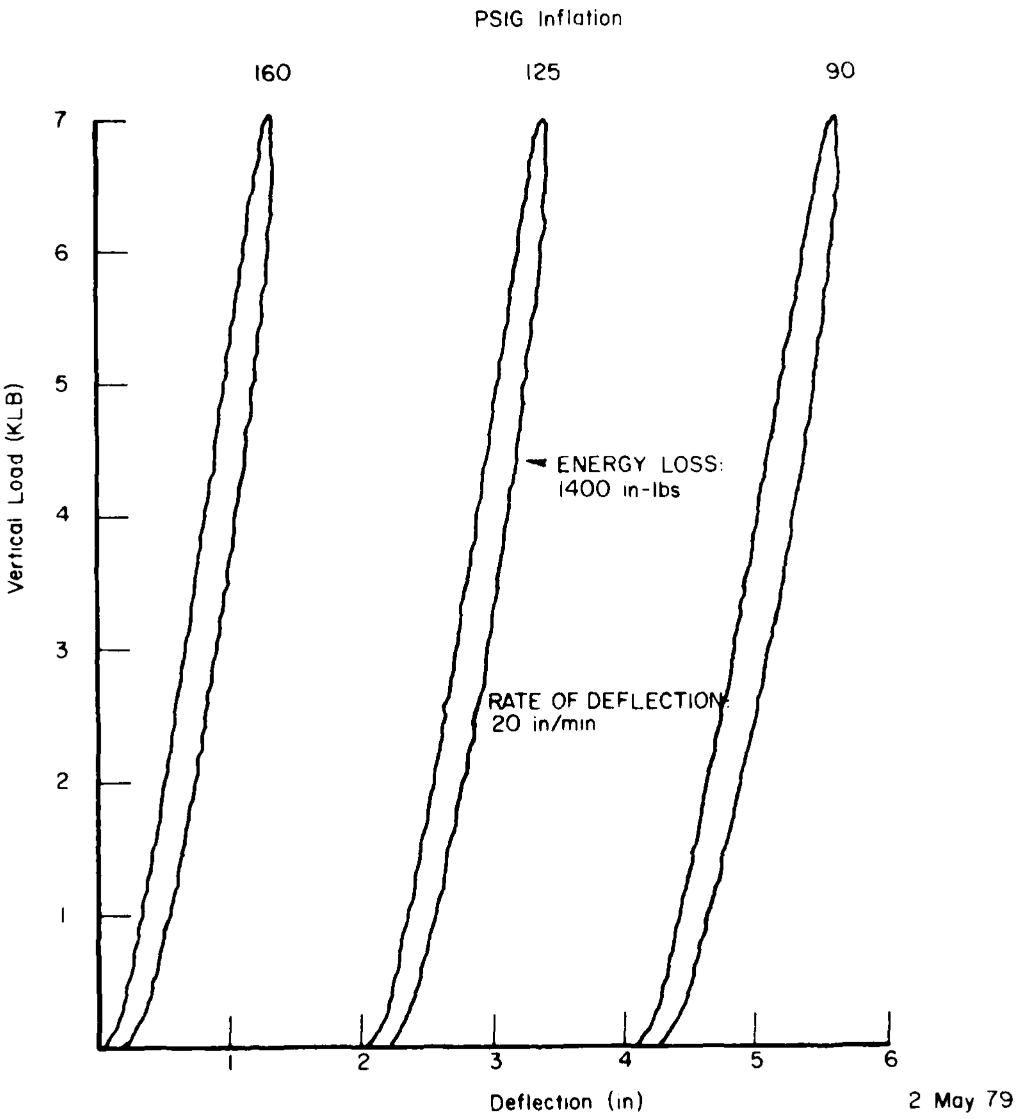


Figure 38. Vertical Load Vs Vertical Deflection, Integral Tire S/N B09802

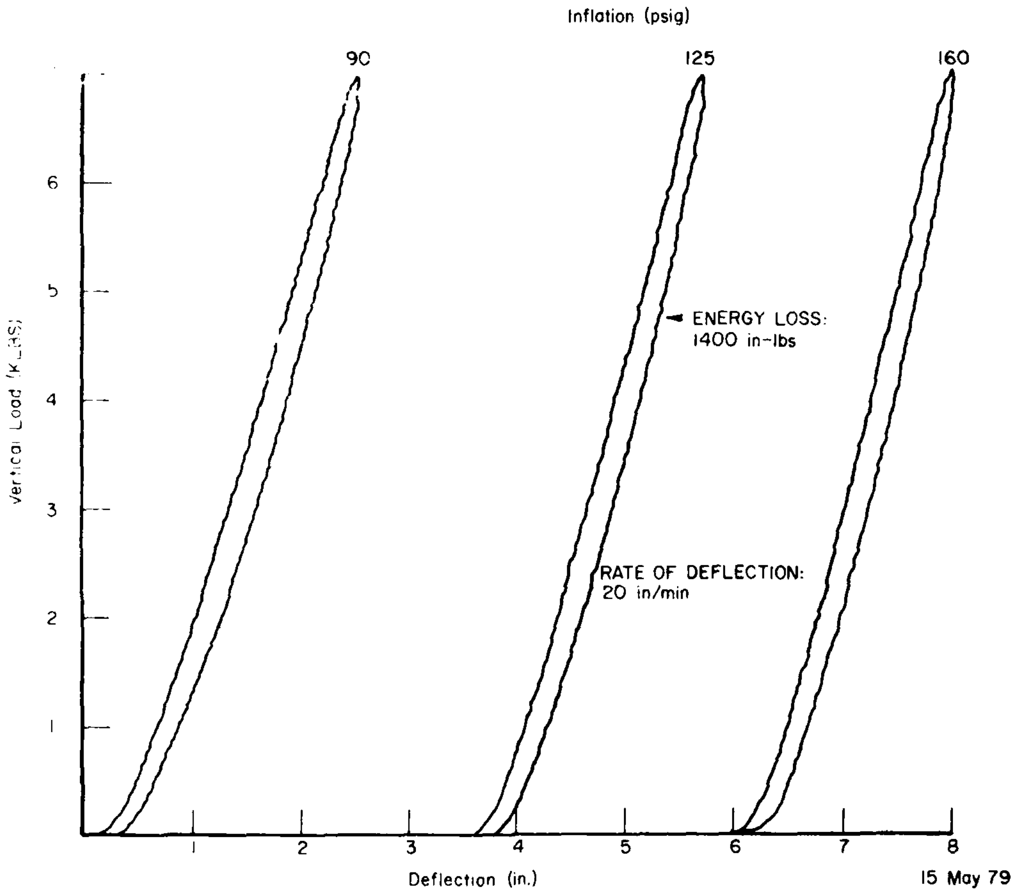


Figure 39. Vertical Load Vs Vertical Deflection, Integral Tire S/N B098P3

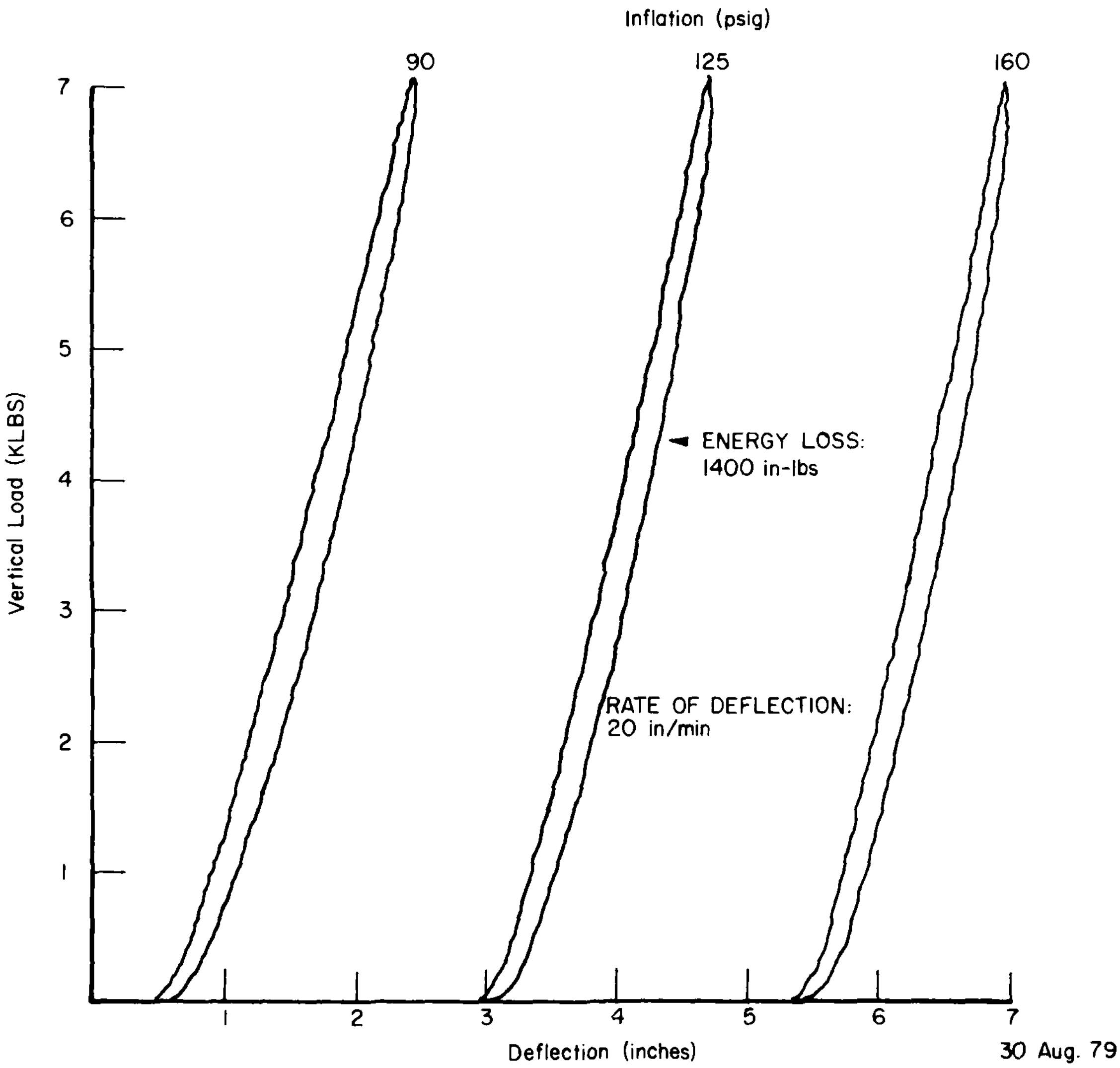


Figure 40. Vertical Load Vs Vertical Deflection, Integral Tire S/N B098R3

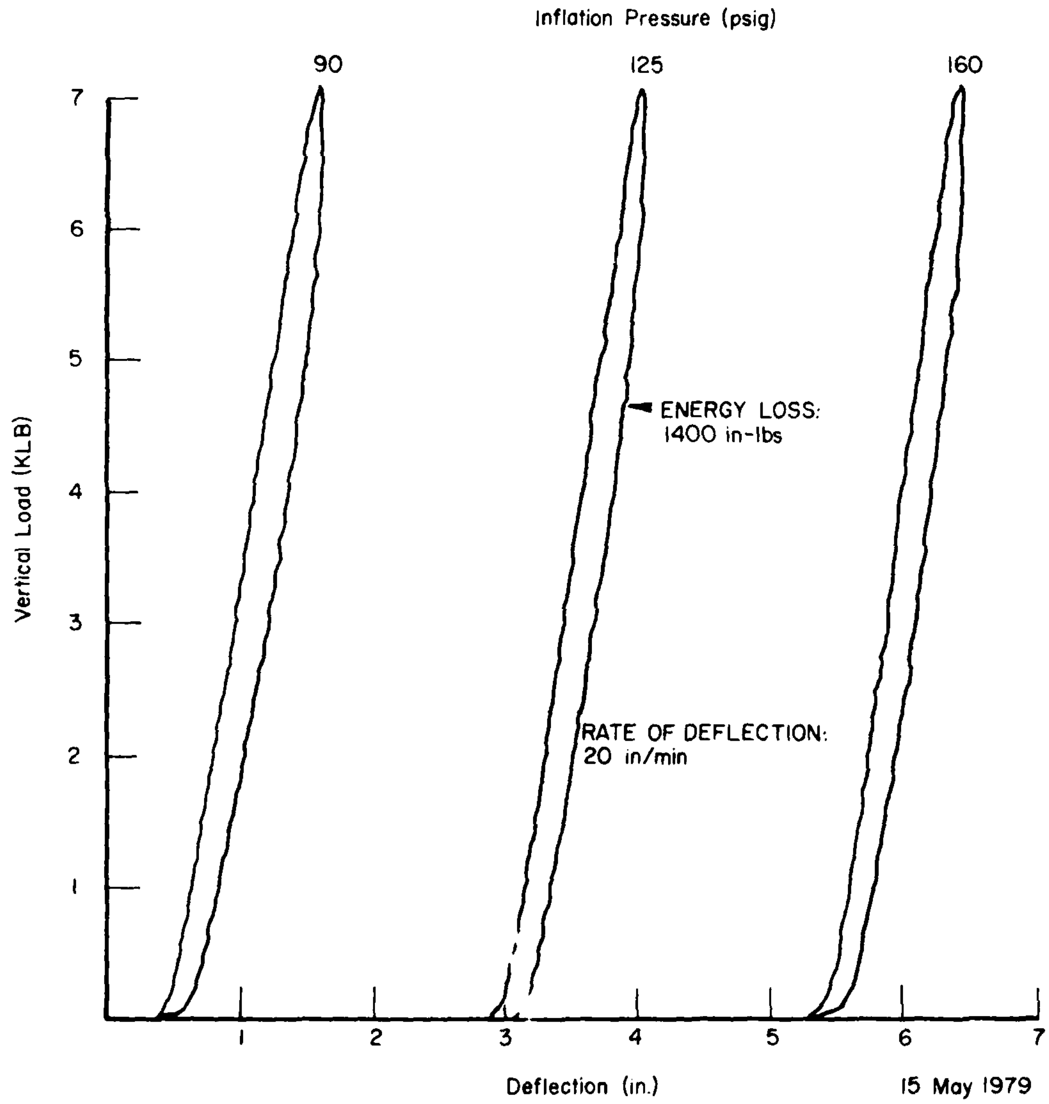


Figure 41. Vertical Load Vs Vertical Deflection, Integral Tire S/N B098S2

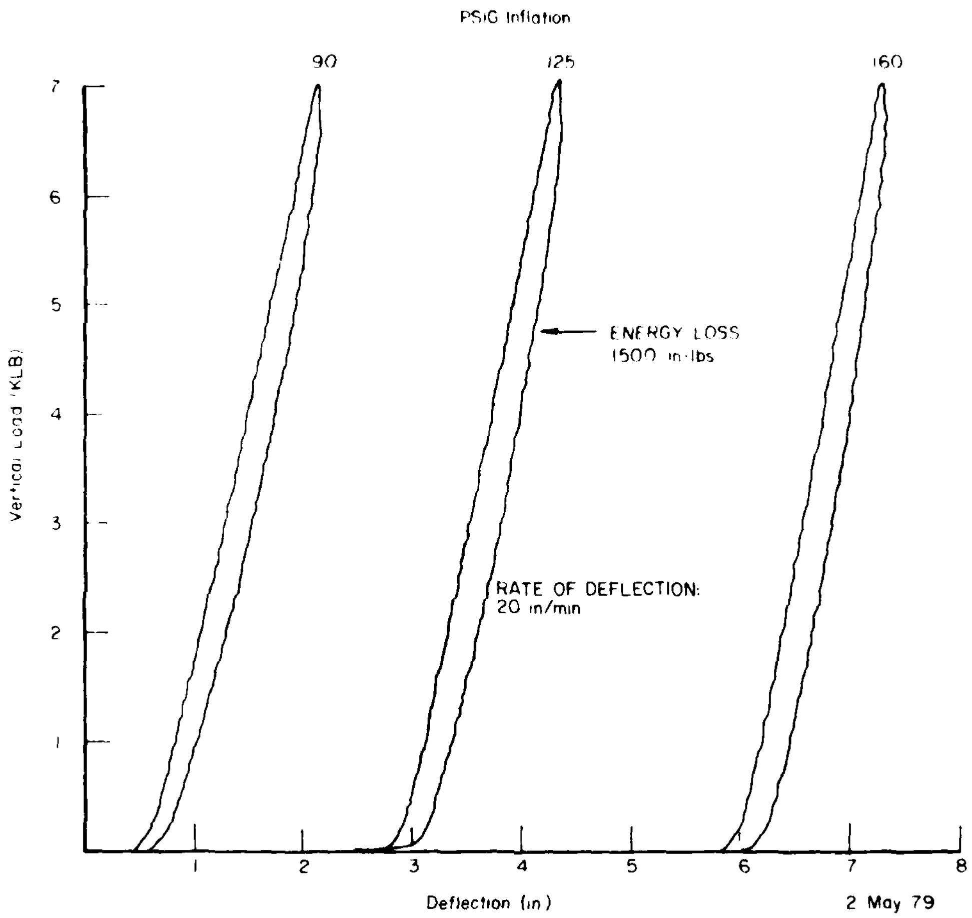


Figure 42. Vertical Load Vs Vertical Deflection, Integral Tire S/N B088K2

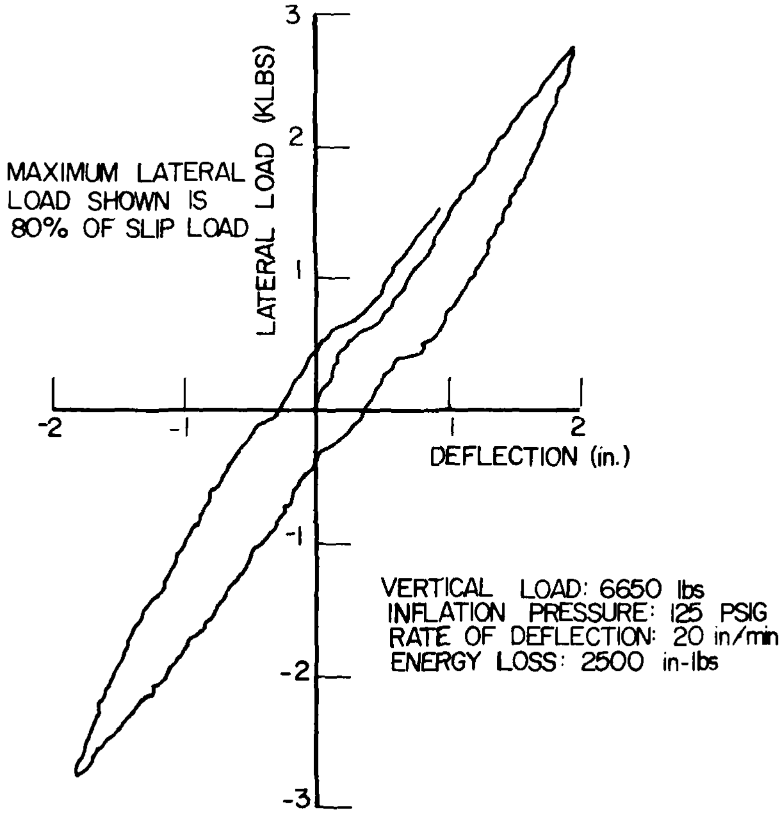


Figure 43. Lateral Load Vs Lateral Deflection, Integral Tire S/N B098S2

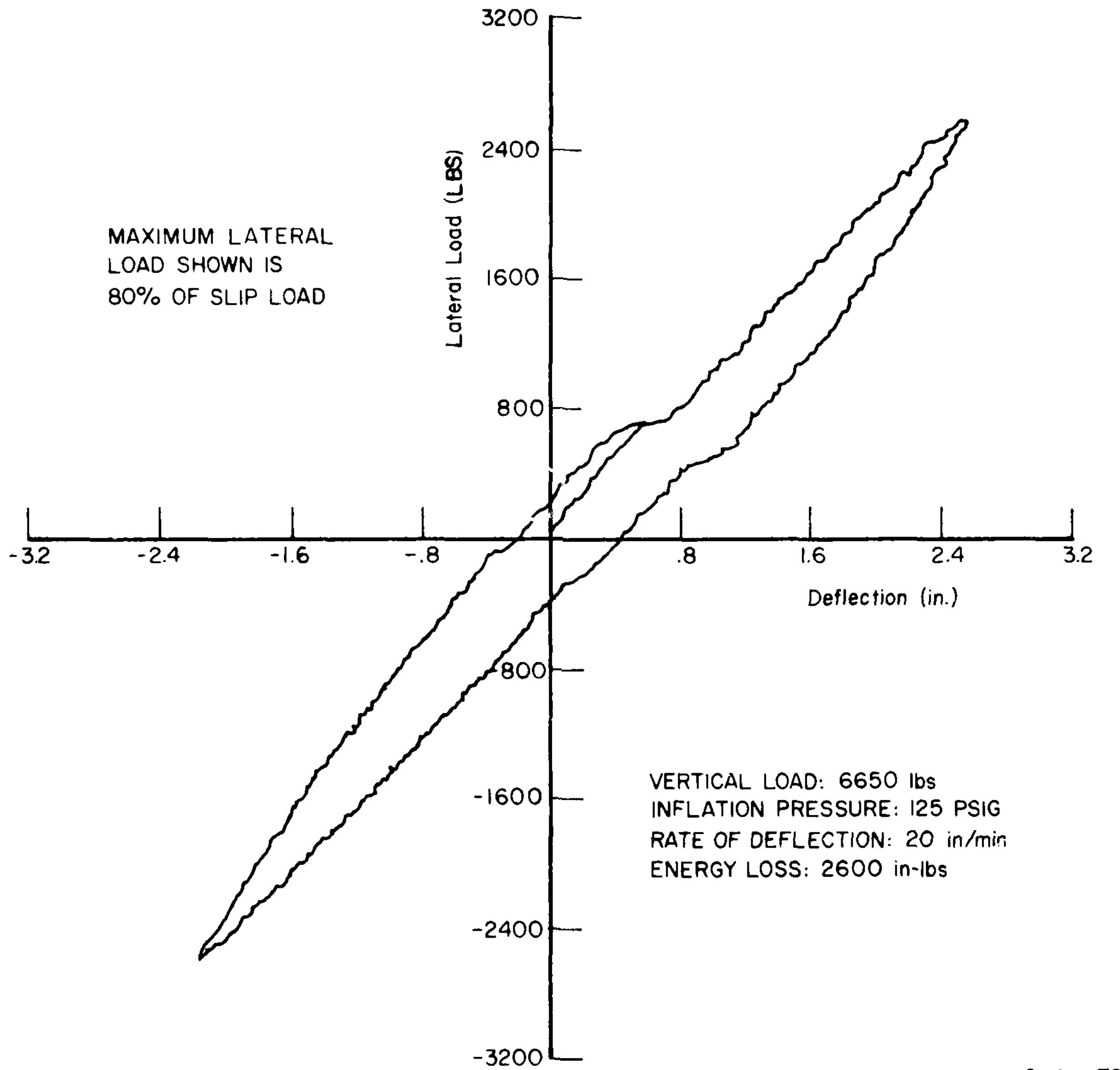


Figure 44. Lateral Load Vs Lateral Deflection, Integral Tire S/N B088I2

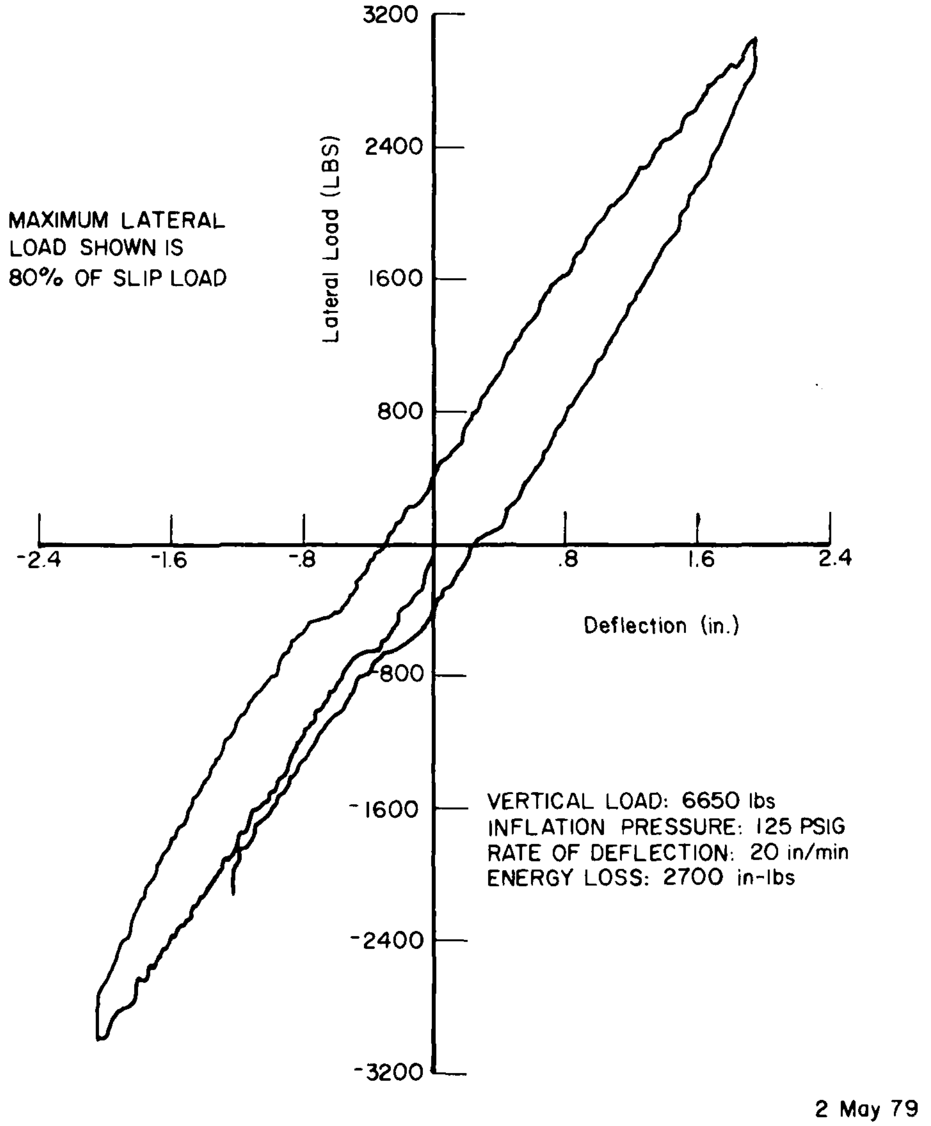


Figure 45. Lateral Load Vs Lateral Deflection, Integral Tire S/N B098L2

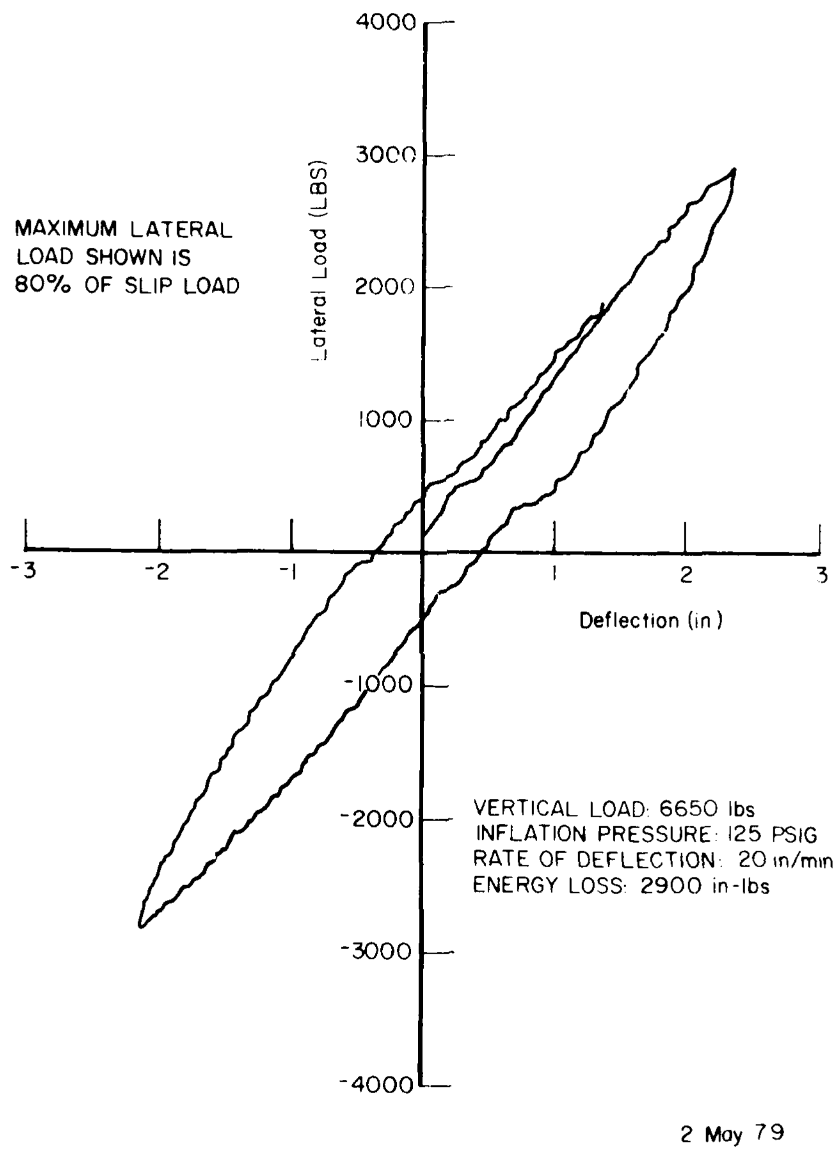


Figure 46. Lateral Load Vs Lateral Deflection, Integral Tire S/N B09802

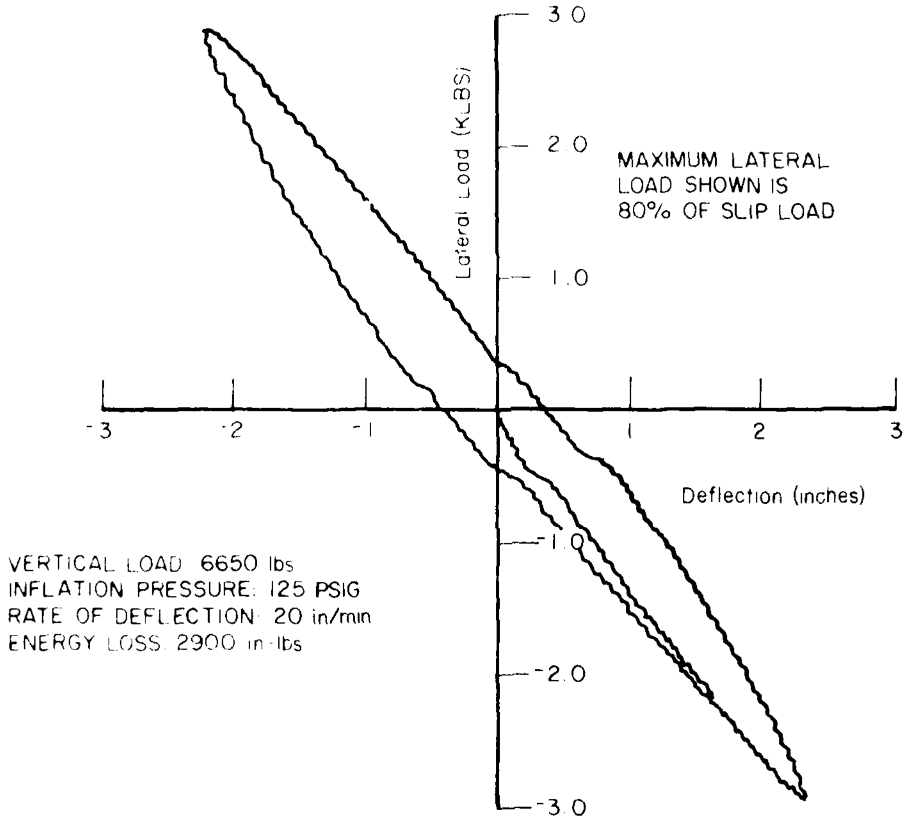


Figure 47. Lateral Load Vs Lateral Deflection, Integral Tire S/N B128U3

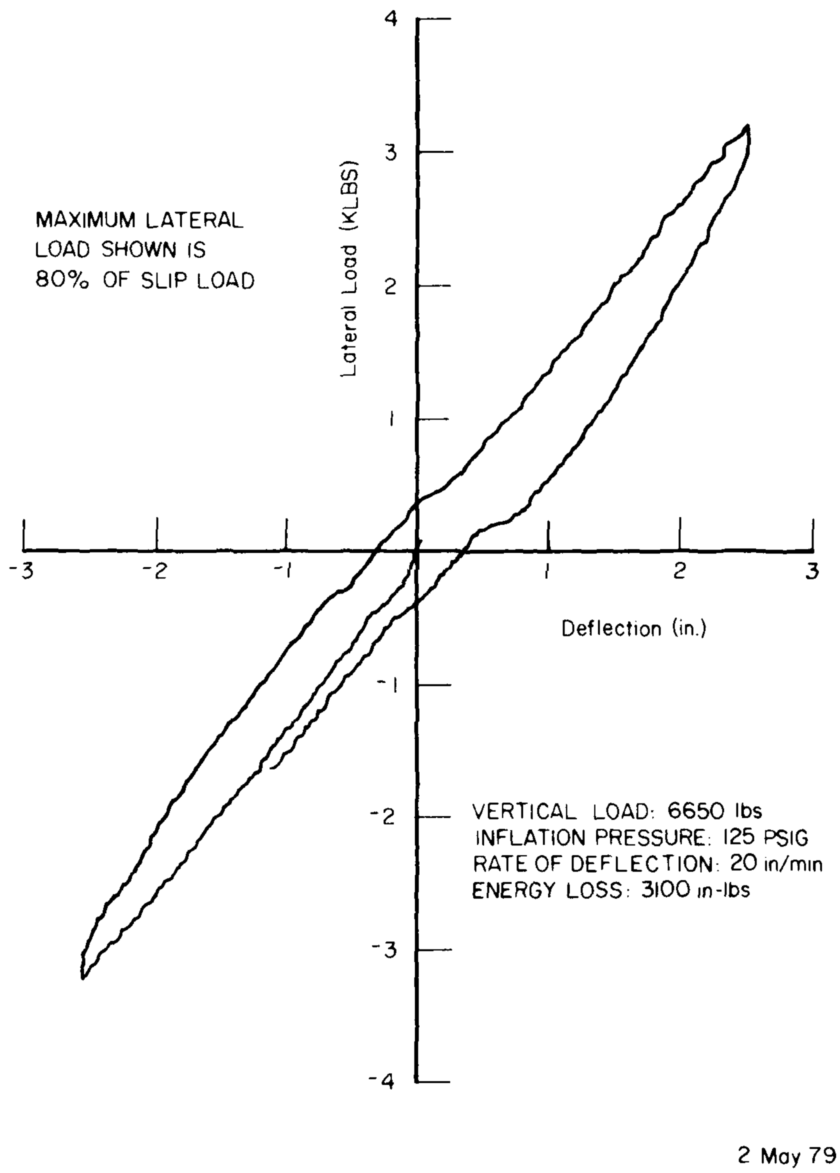


Figure 48. Lateral Load Vs Lateral Deflection, Baseline Bias Tire S/N 1006

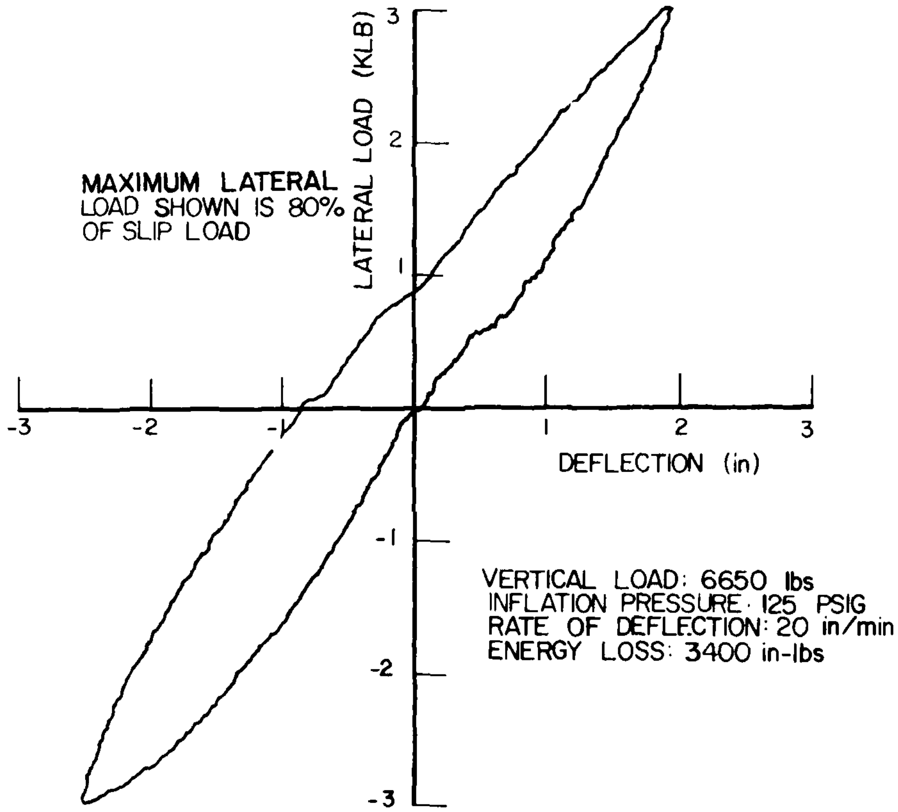


Figure 49. Lateral Load Vs Lateral Deflection, Integral Tire S/N B098M2

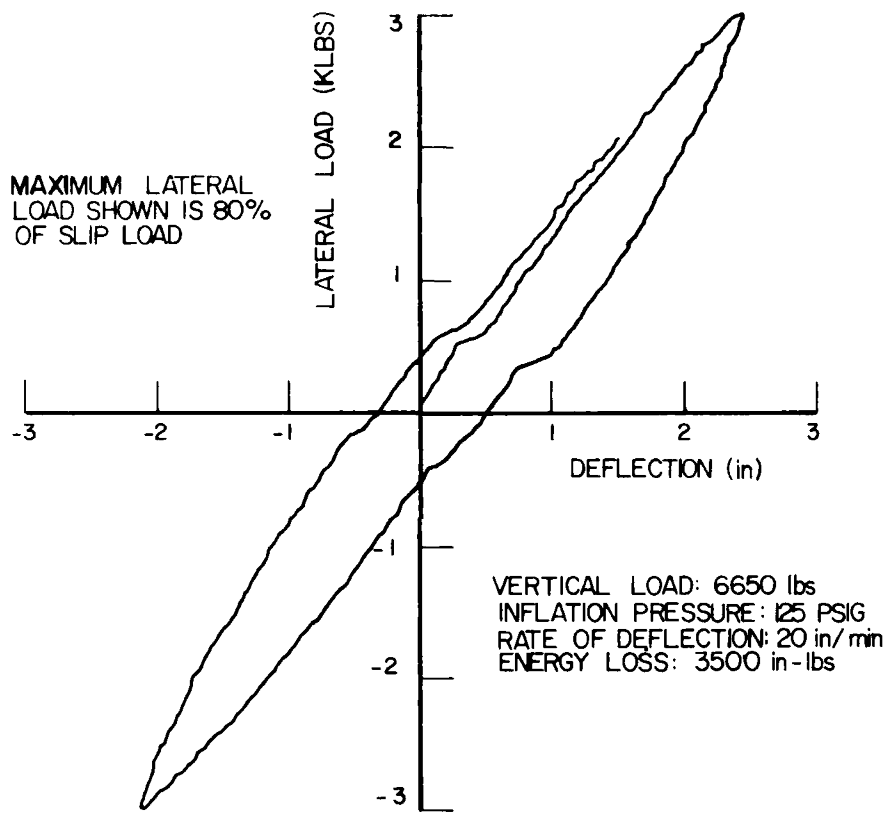


Figure 50. Lateral Load Vs Lateral Deflection, Integral Tire S/N B098N3

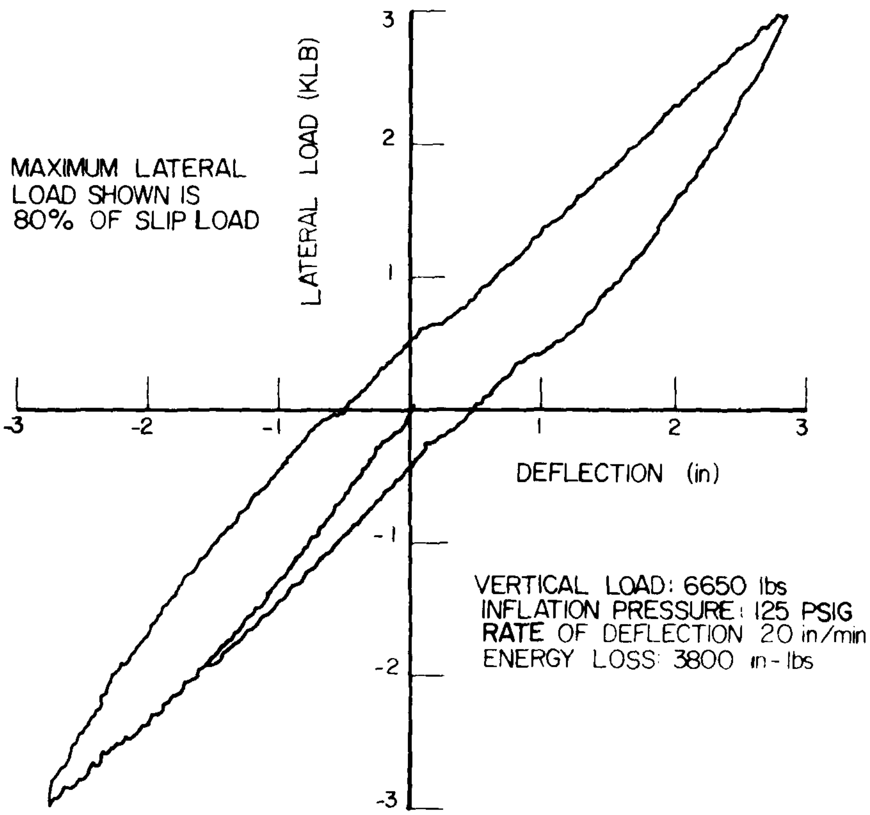


Figure 51. Lateral Load Vs Lateral Deflection, Integral Tire S/N B088K2

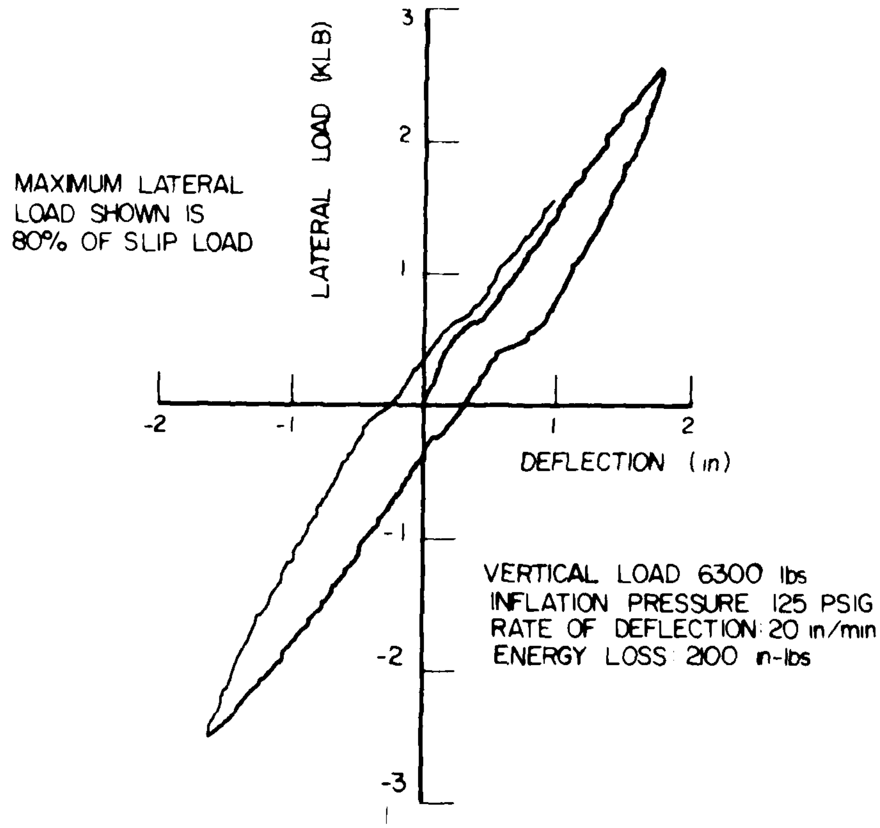


Figure 52. Lateral Load Vs Lateral Deflection, Integral Tire S/N B098S2

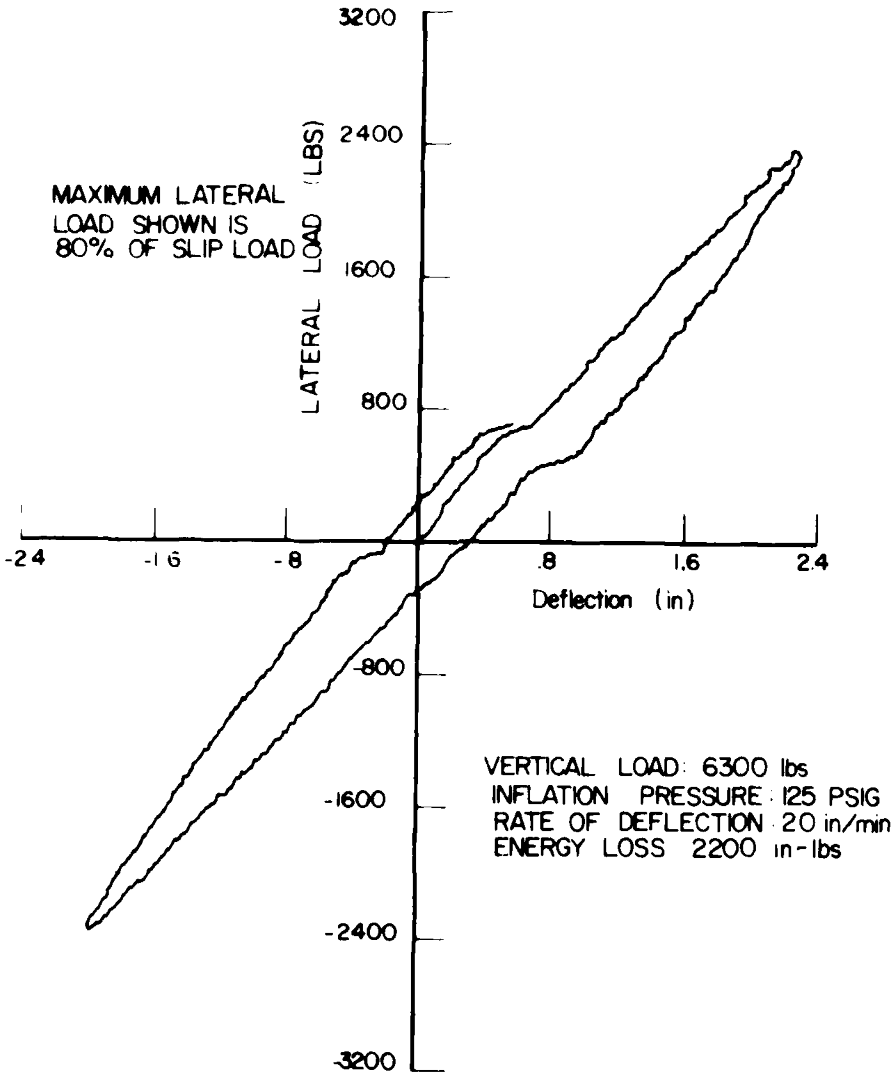


Figure 53. Lateral Load Vs Lateral Deflection, Integral Tire S/N B08812

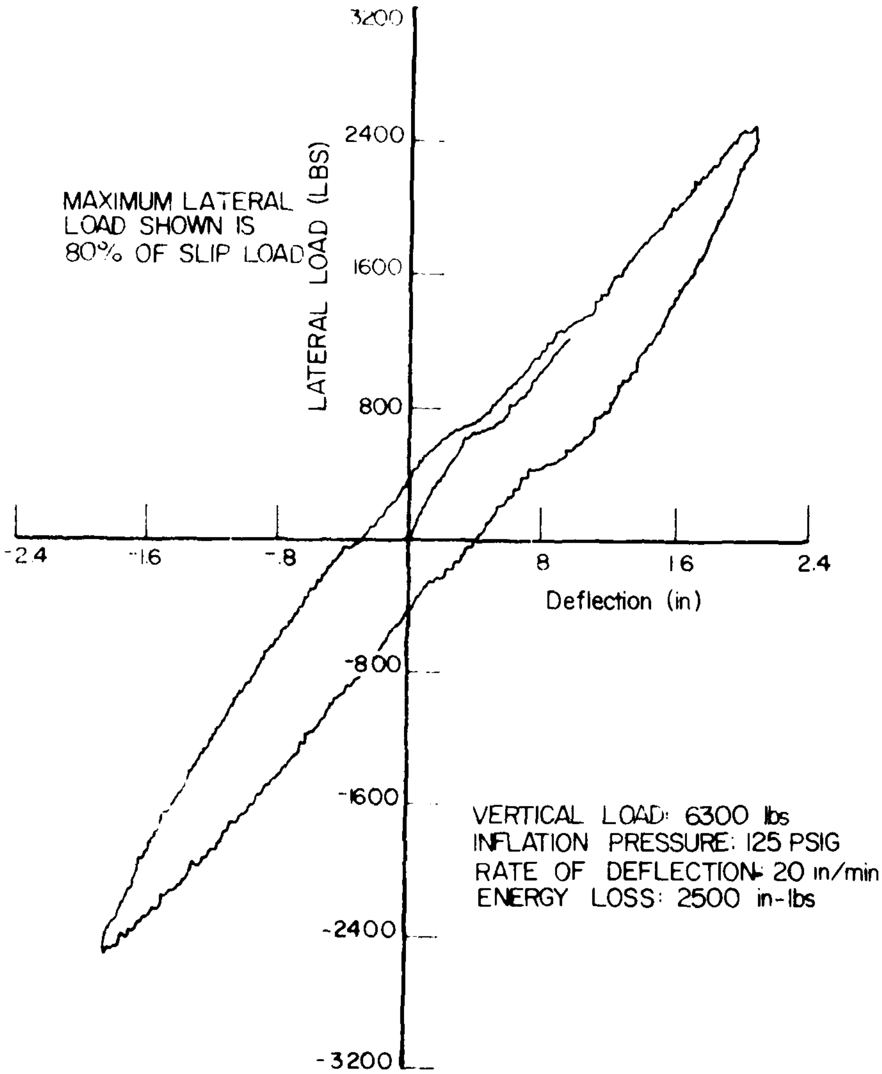


Figure 54. Lateral Load Vs Lateral Deflection, Integral Tire
S/N B098L2

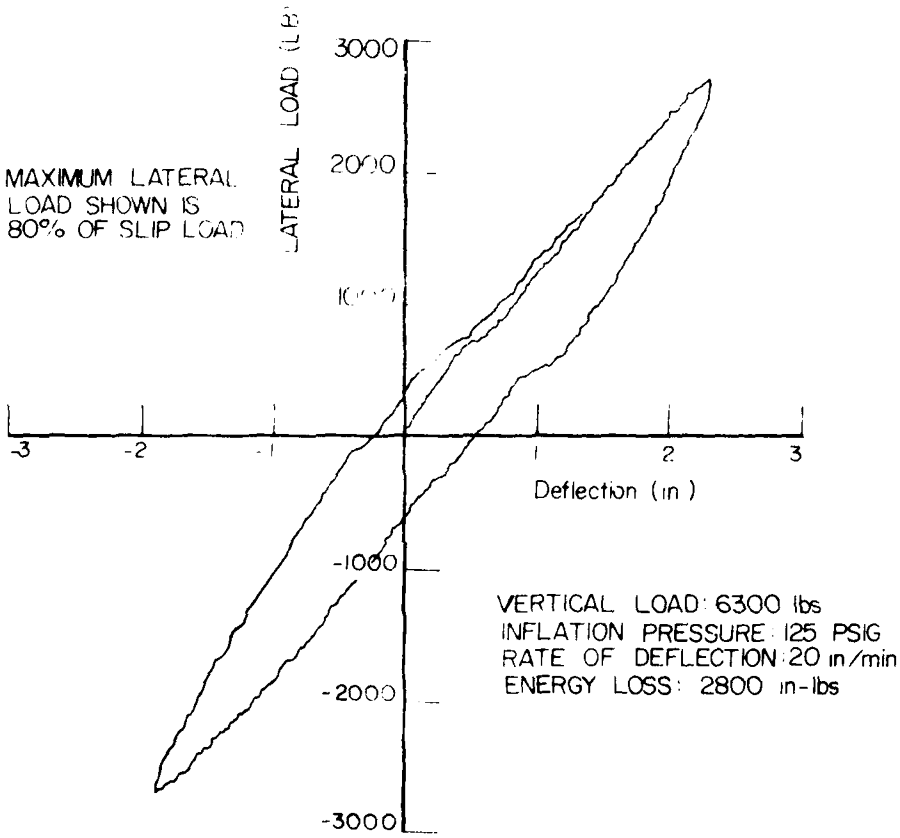


Figure 55. Lateral Load Vs Lateral Deflection, Integral Tire S/N B09802

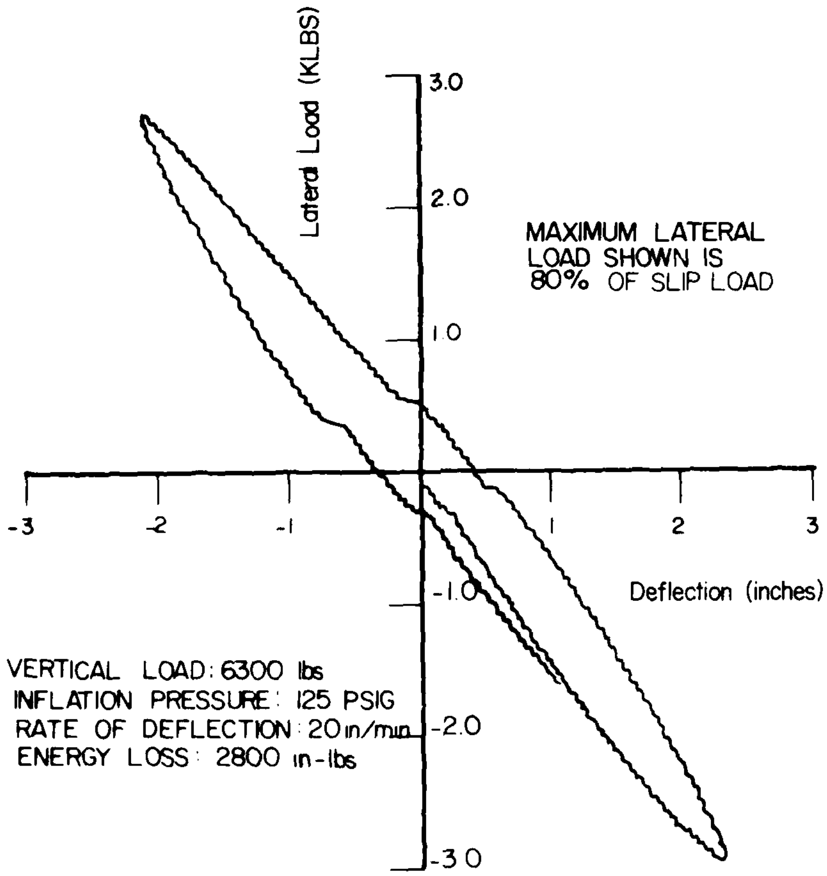


Figure 56. Lateral Load Vs Lateral Deflection, Integral Tire S/N B128U3

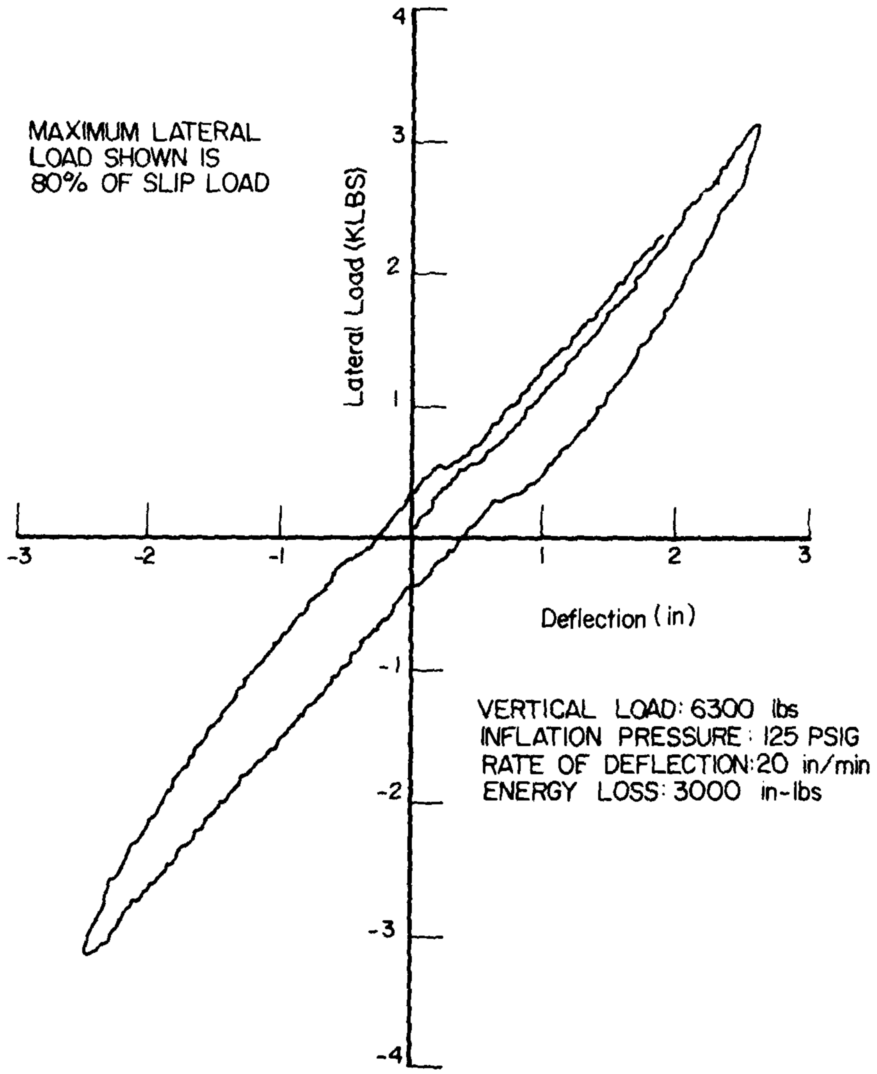


Figure 57. Lateral Load Vs Lateral Deflection, Baseline Bias Tire S/N 1006

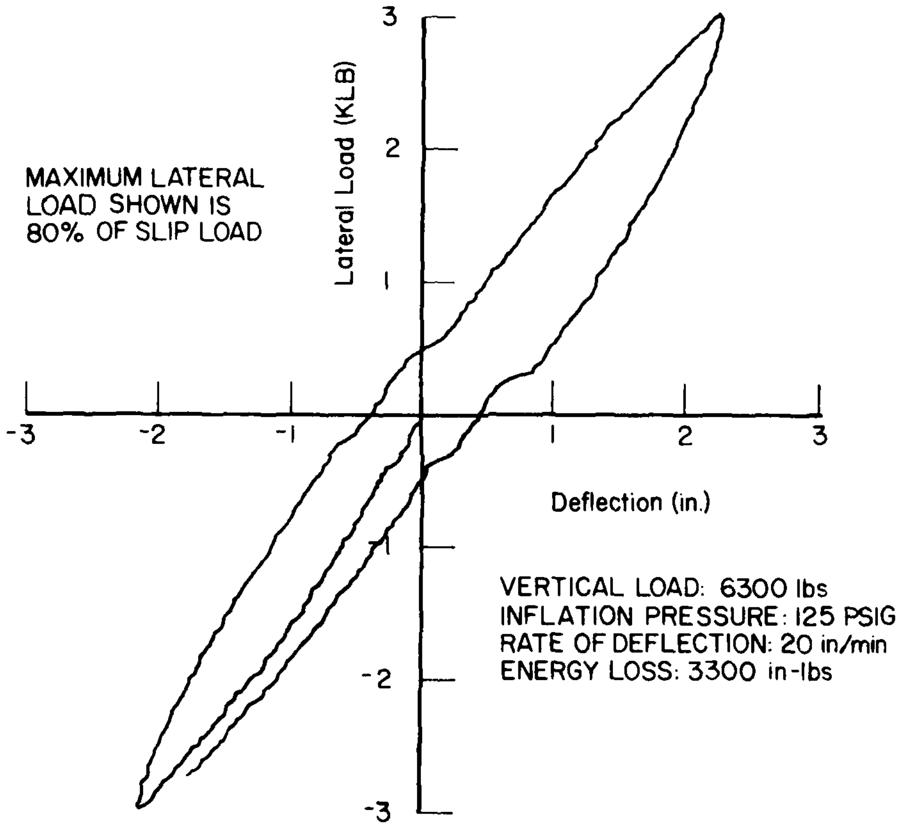


Figure 58. Lateral Load Vs Lateral Deflection, Integral Tire S/N B098M2

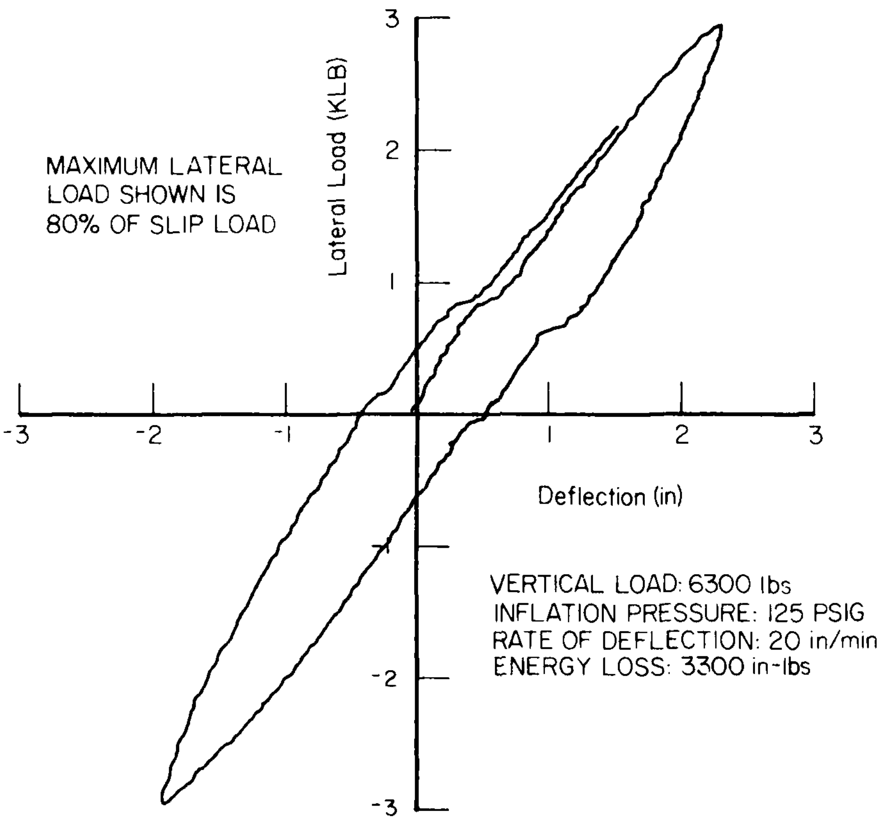


Figure 59. Lateral Load Vs Lateral Deflection, Integral Tire S/N B098N3

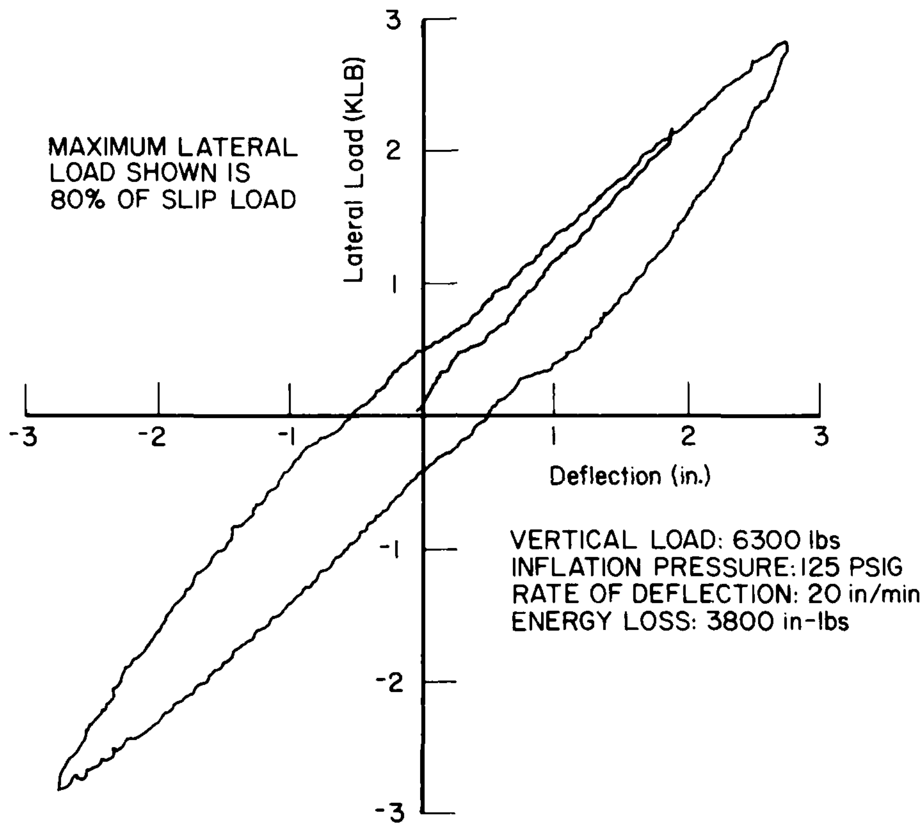
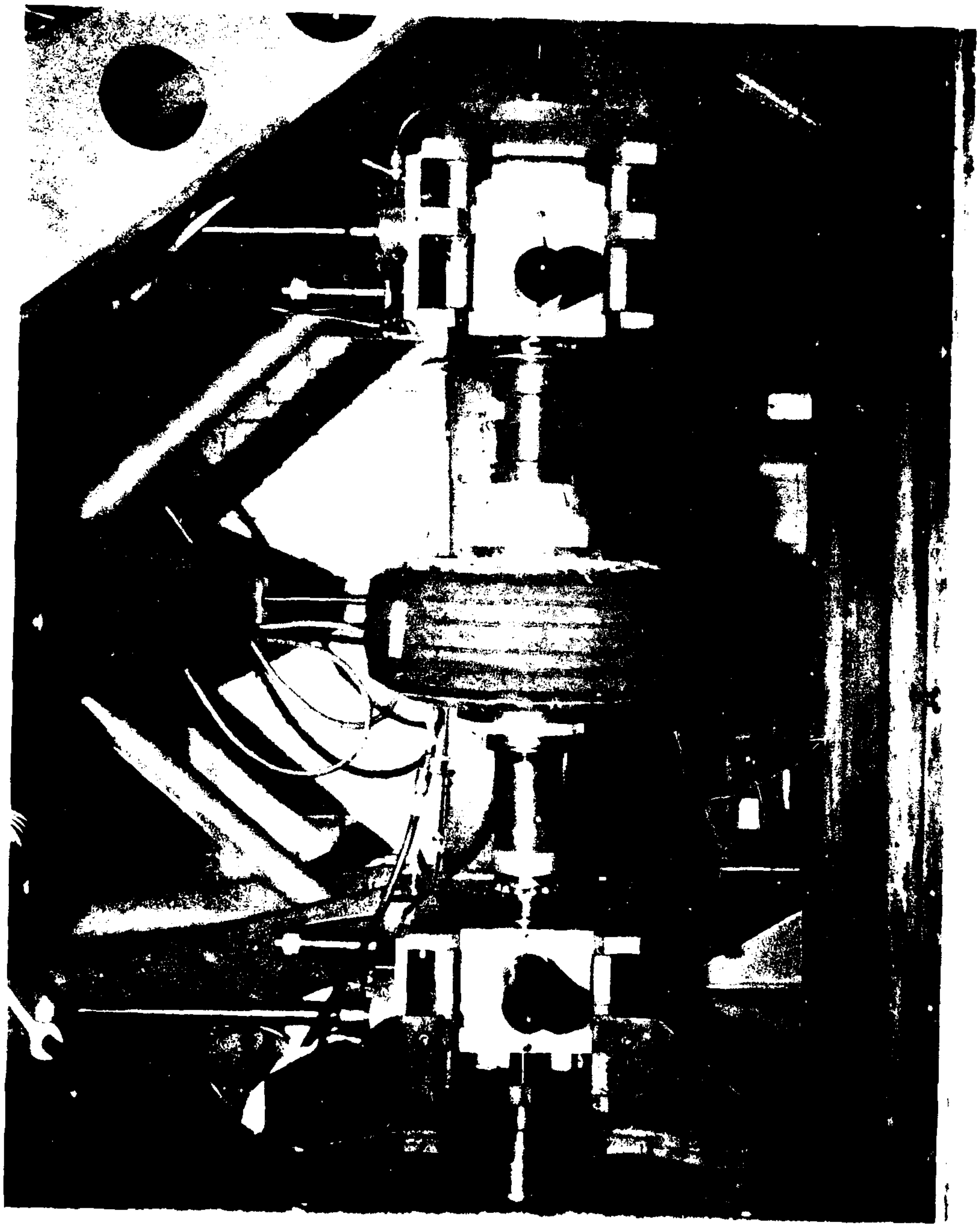
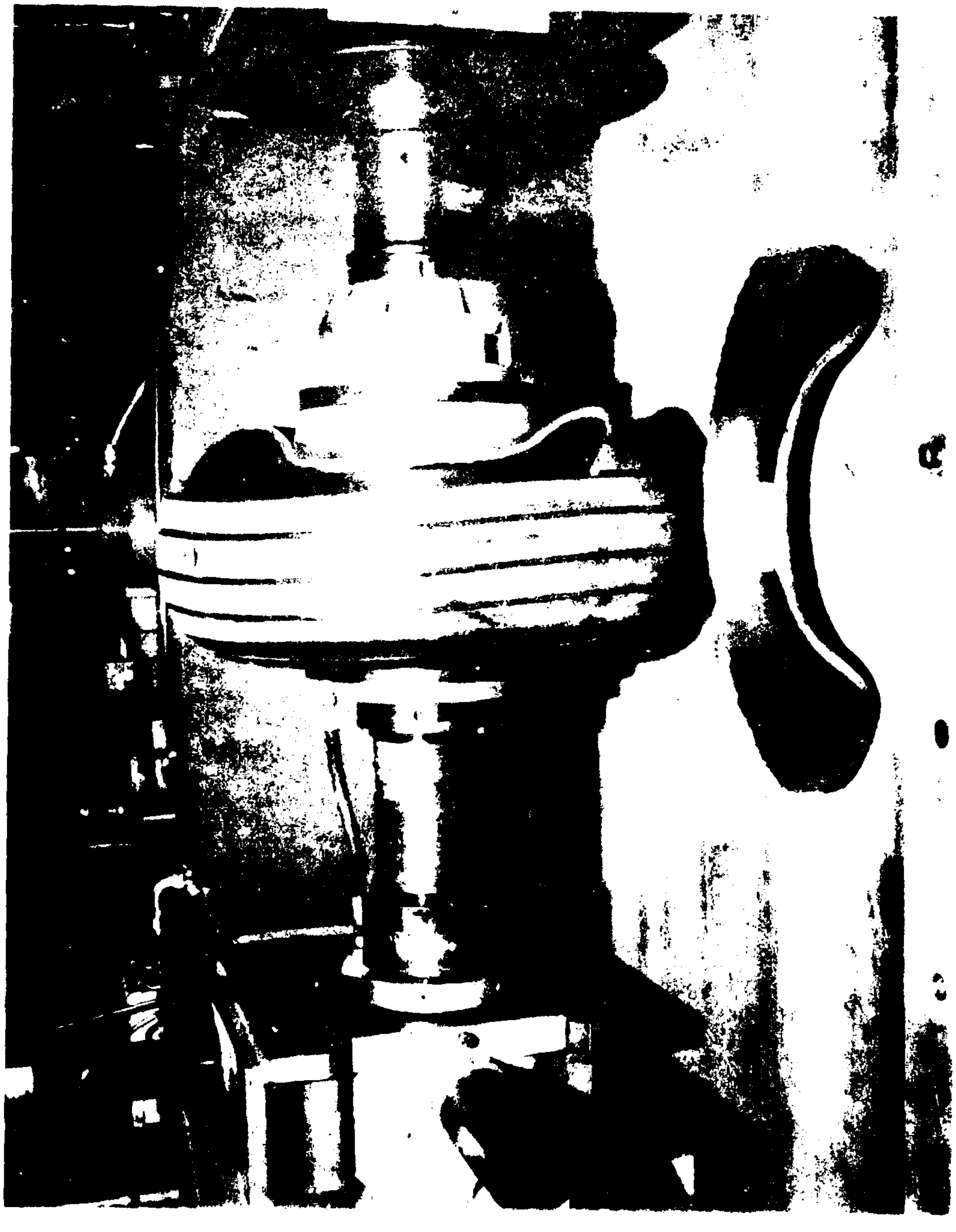


Figure 60. Lateral Load Vs Lateral Deflection, Integral Tire S/N B088K2





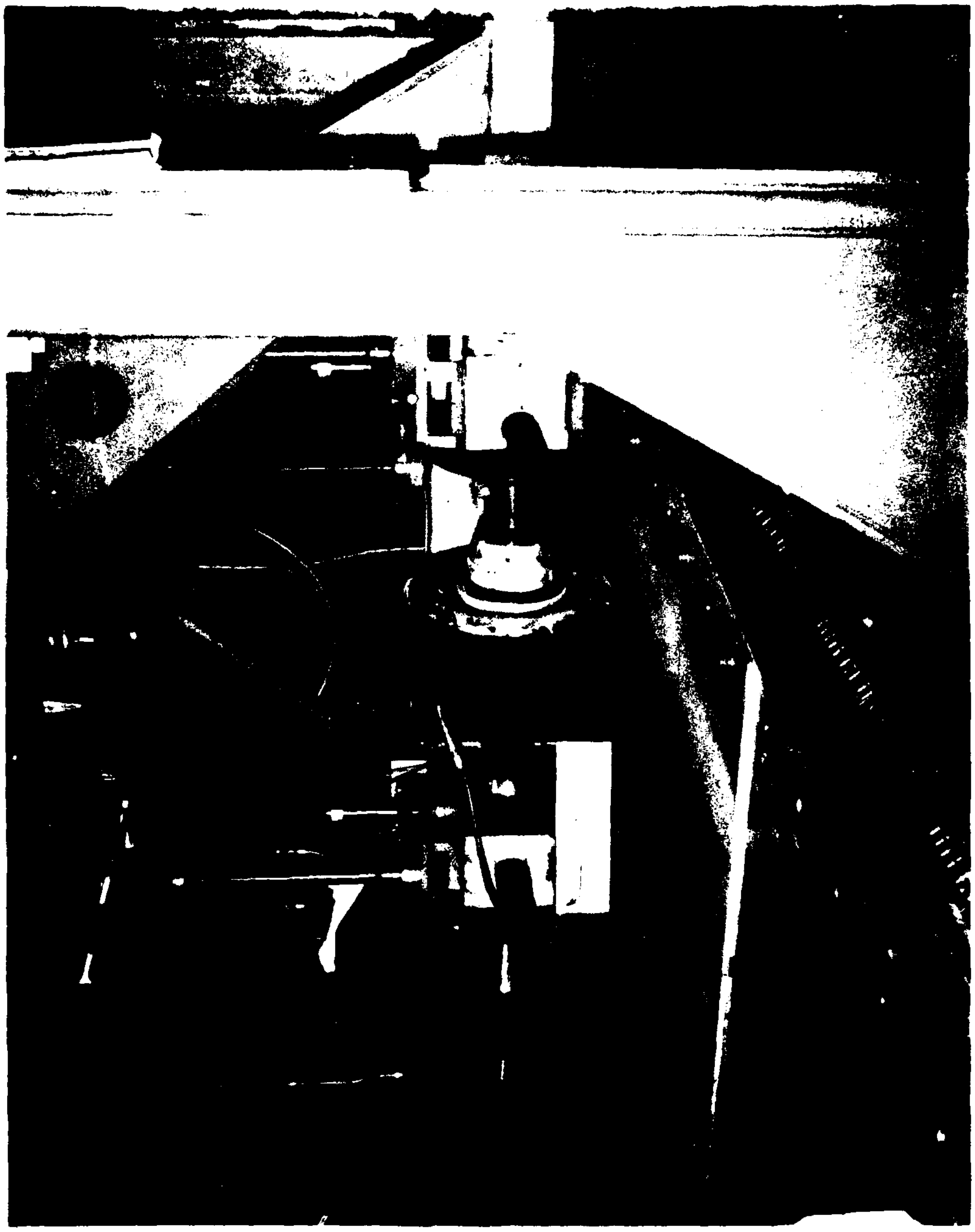


Figure [illegible] SEM

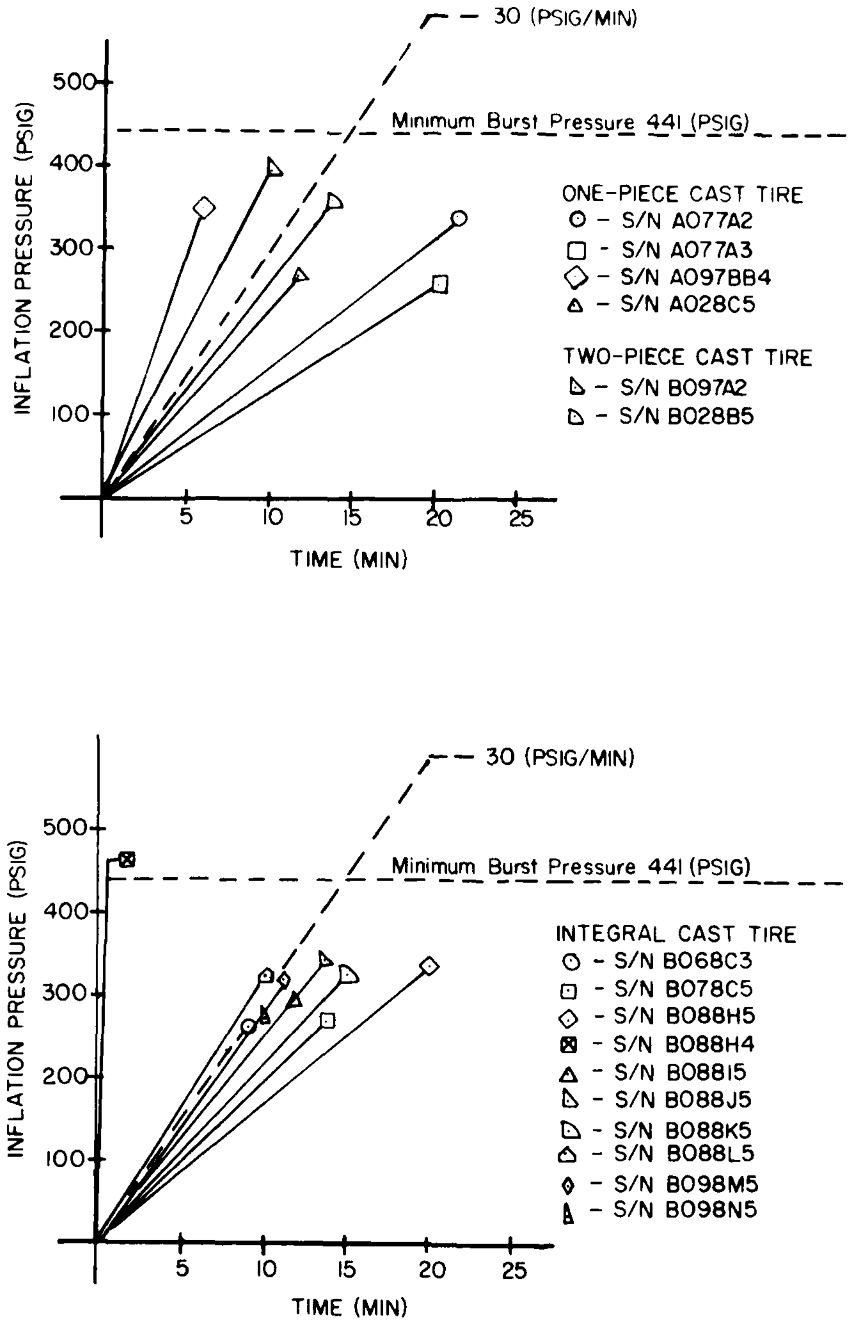


Figure 65. Burst Test Data

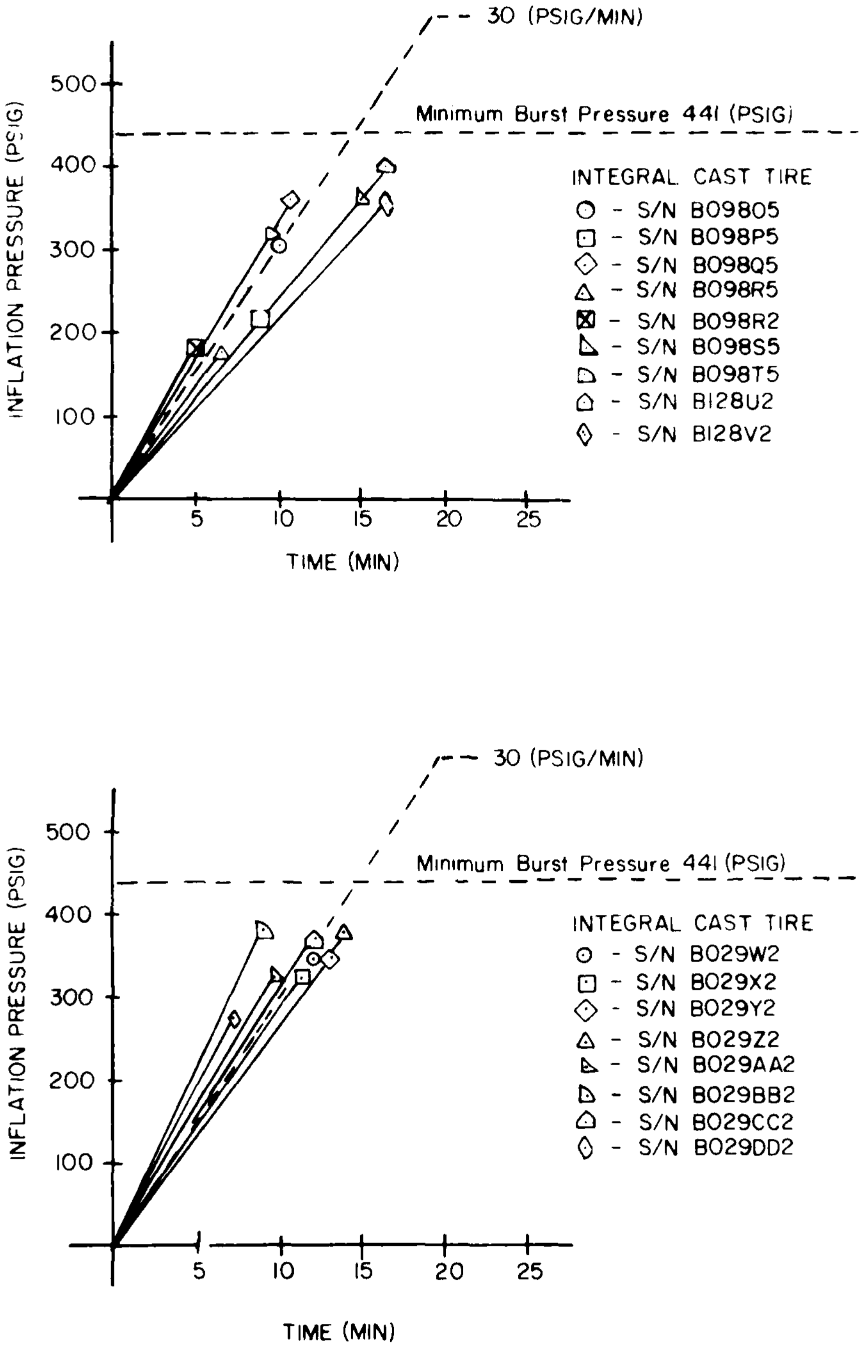


Figure 66. Burst Test Data

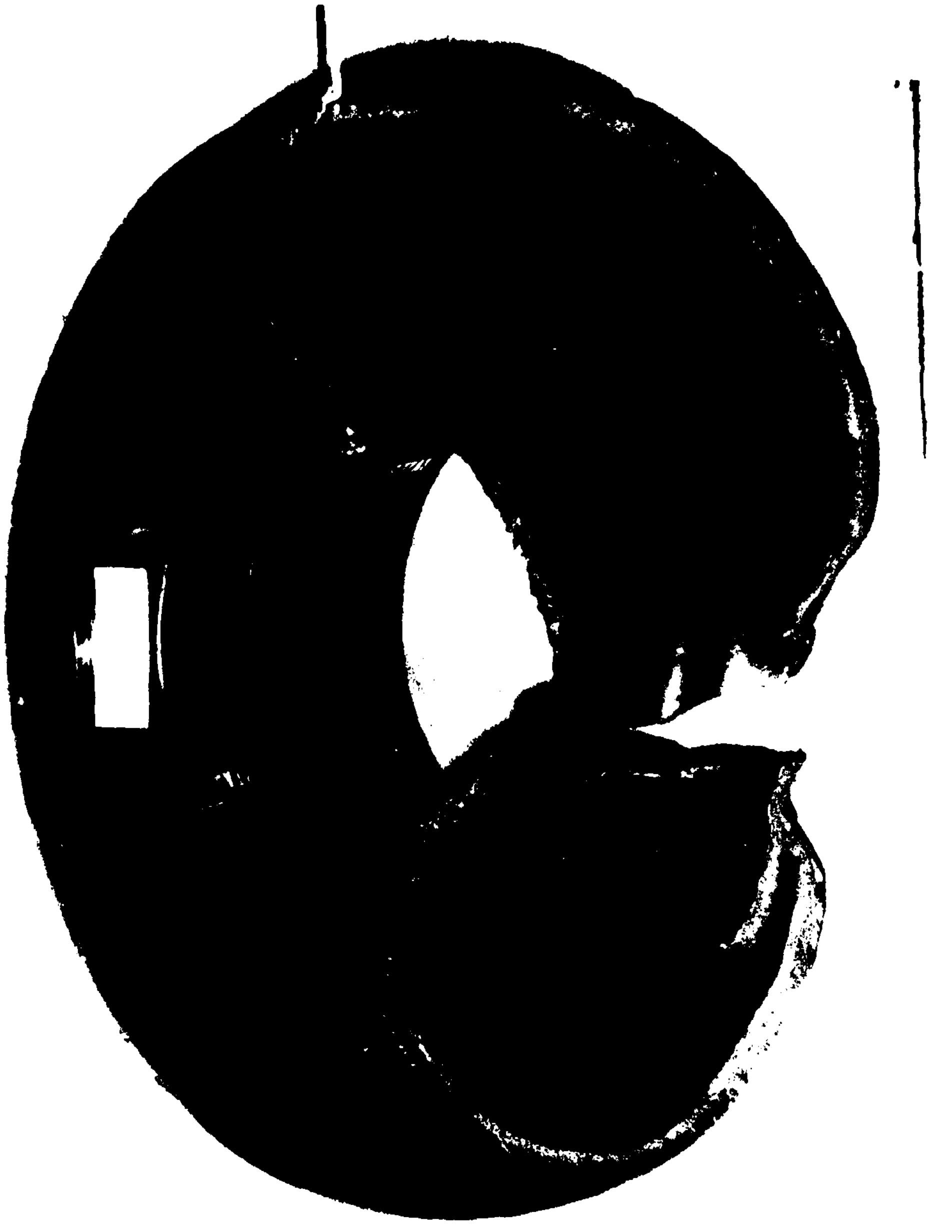


Figure 67. Burst Test One-Piece Cast Tire (S/N A077A3)
Brittle Failure-Crown & Sidewall @ 260 PSIG

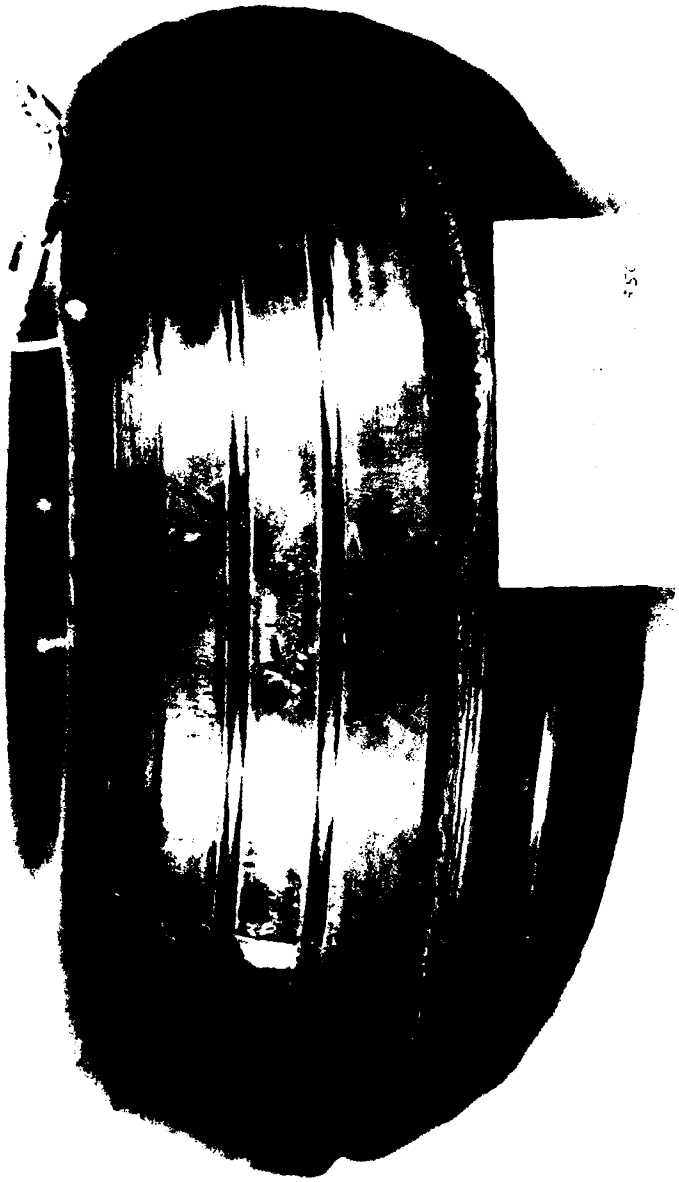


Figure 68. Burst Test One-Piece Cast Tire (S/N A097BB4)
Material Creep Failure-Tread Grooves @ 350 PSIG

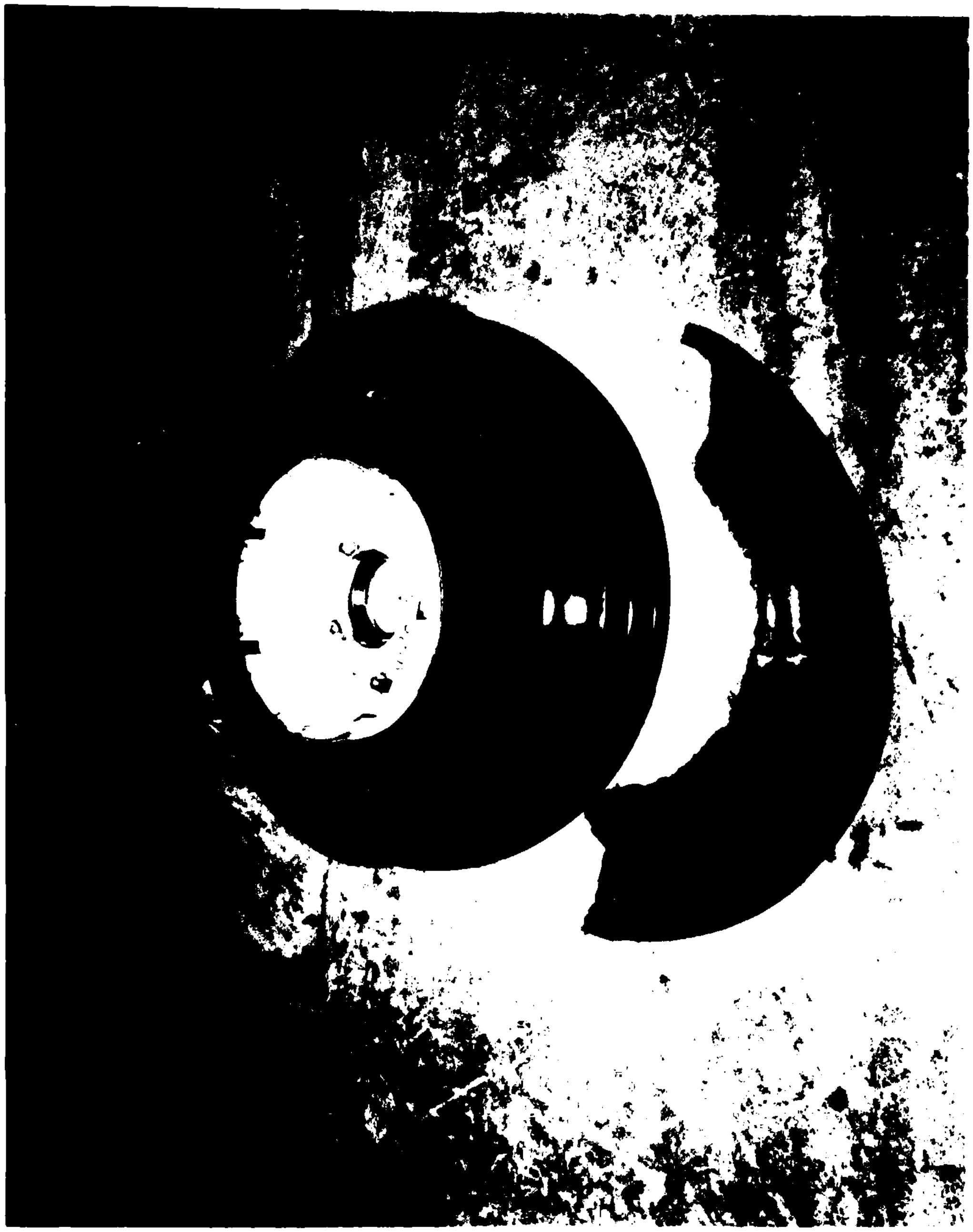


Figure 69. Burst Test One-Piece Cast Tire (S/N A028C5)
Brittle Failure-Sidewall @ 270 PSIG

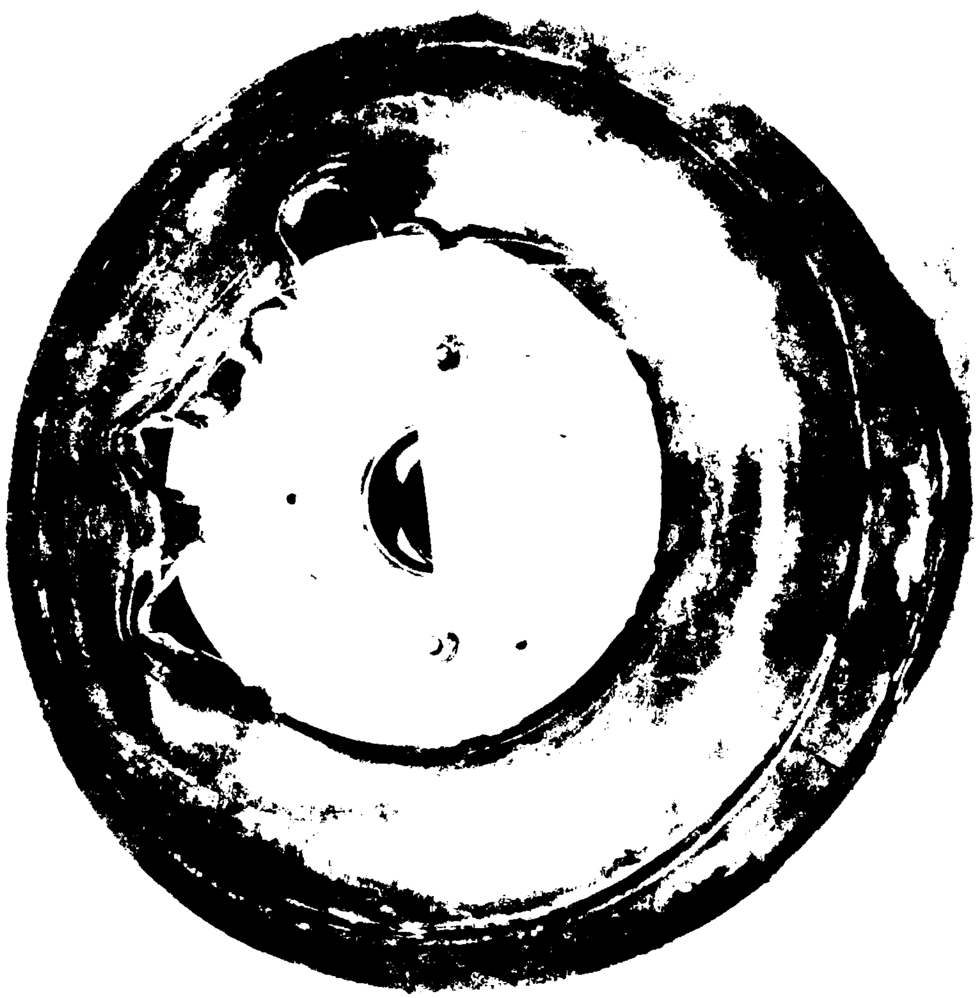


Figure [illegible]. Burst Test Two-Piece Cast Tire [illegible]
Material Crack Failure Bead [illegible]

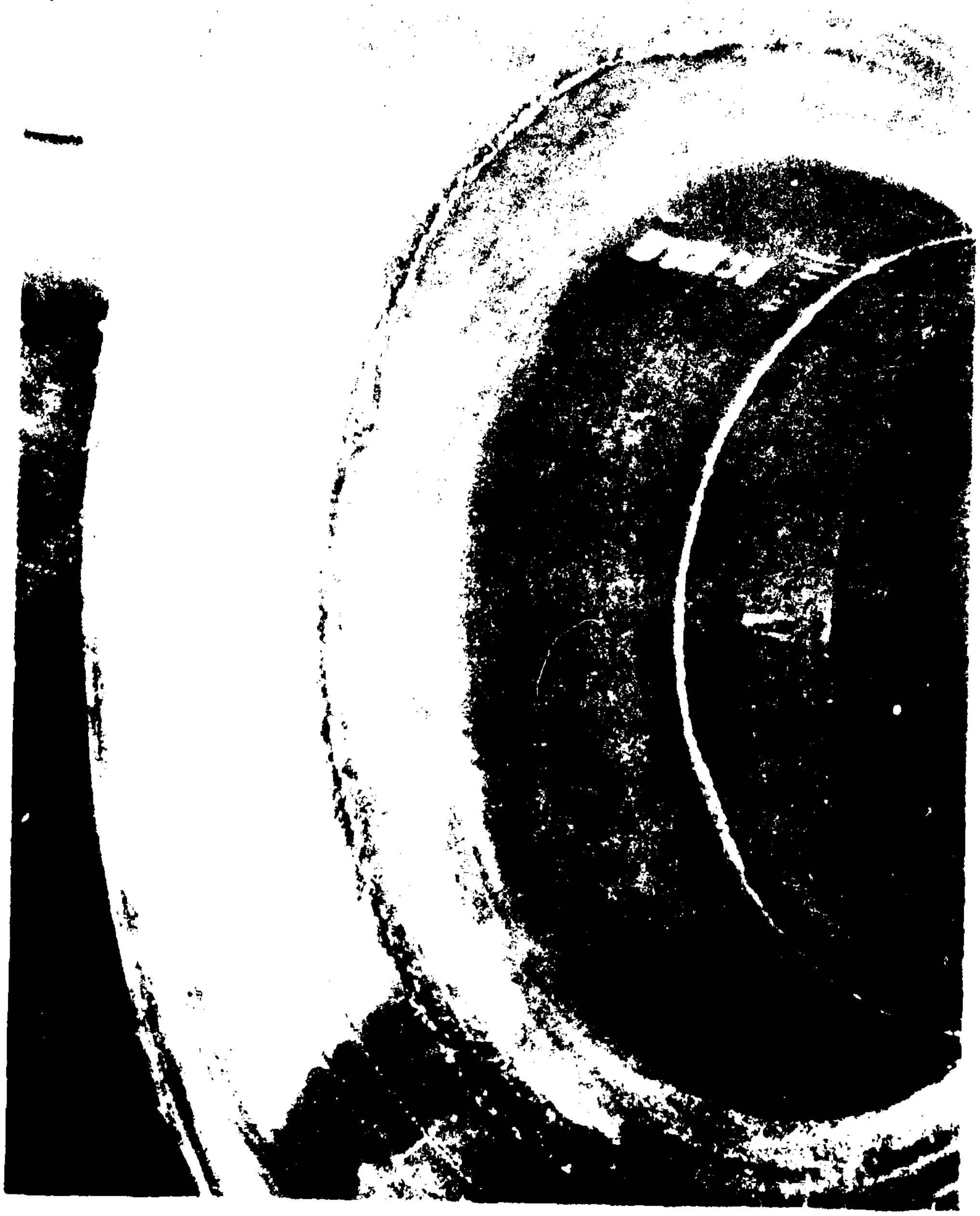


Figure 71. Burst Test Two-Piece Cast Tire (S/N B[illegible])
Brittle Failure-Bead [illegible]

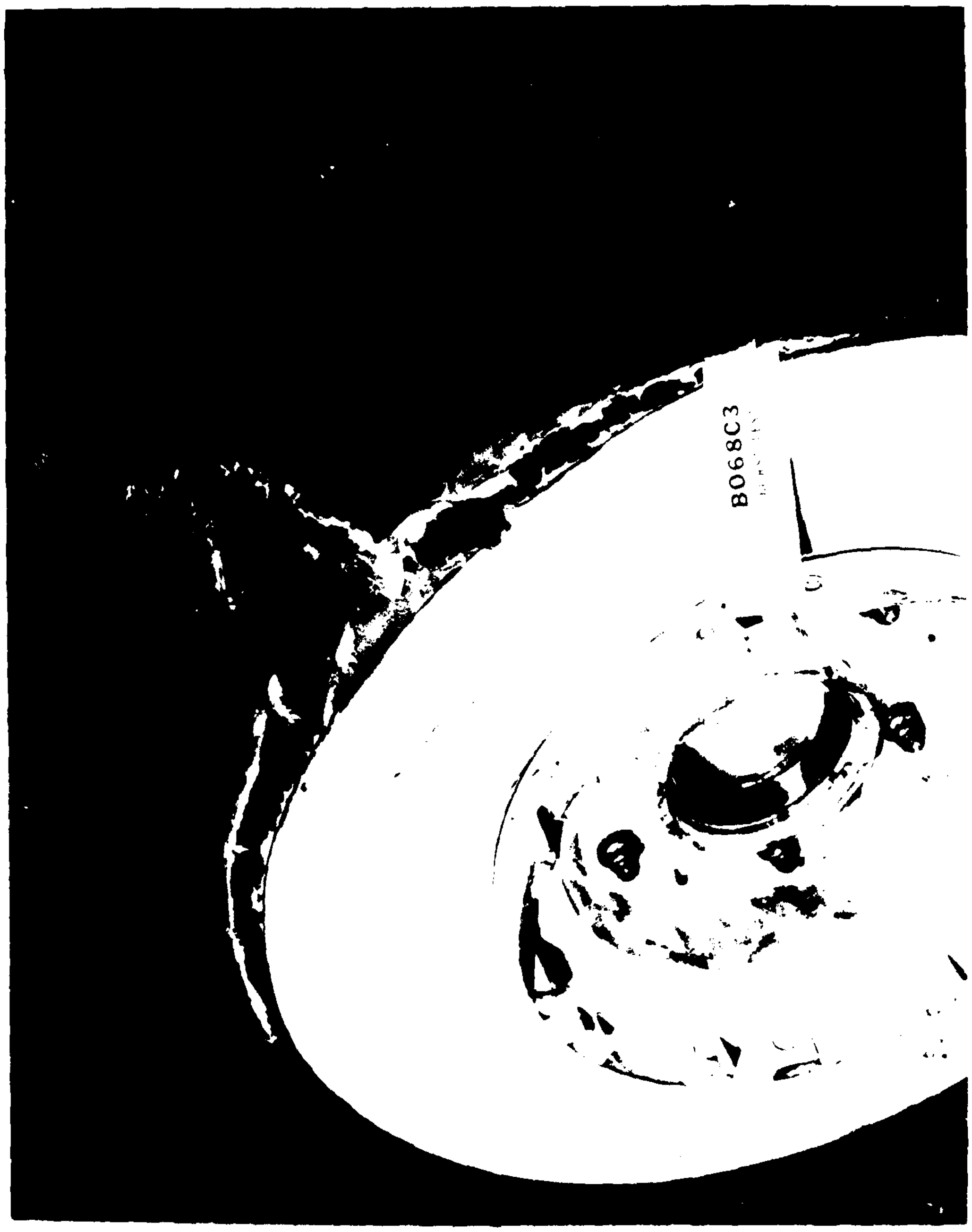


Figure 72. Burst Test Integral Cast Tire (S/N B068C3)
Material Creep Failure-Crown & Belt Edge @ 265 PSIG

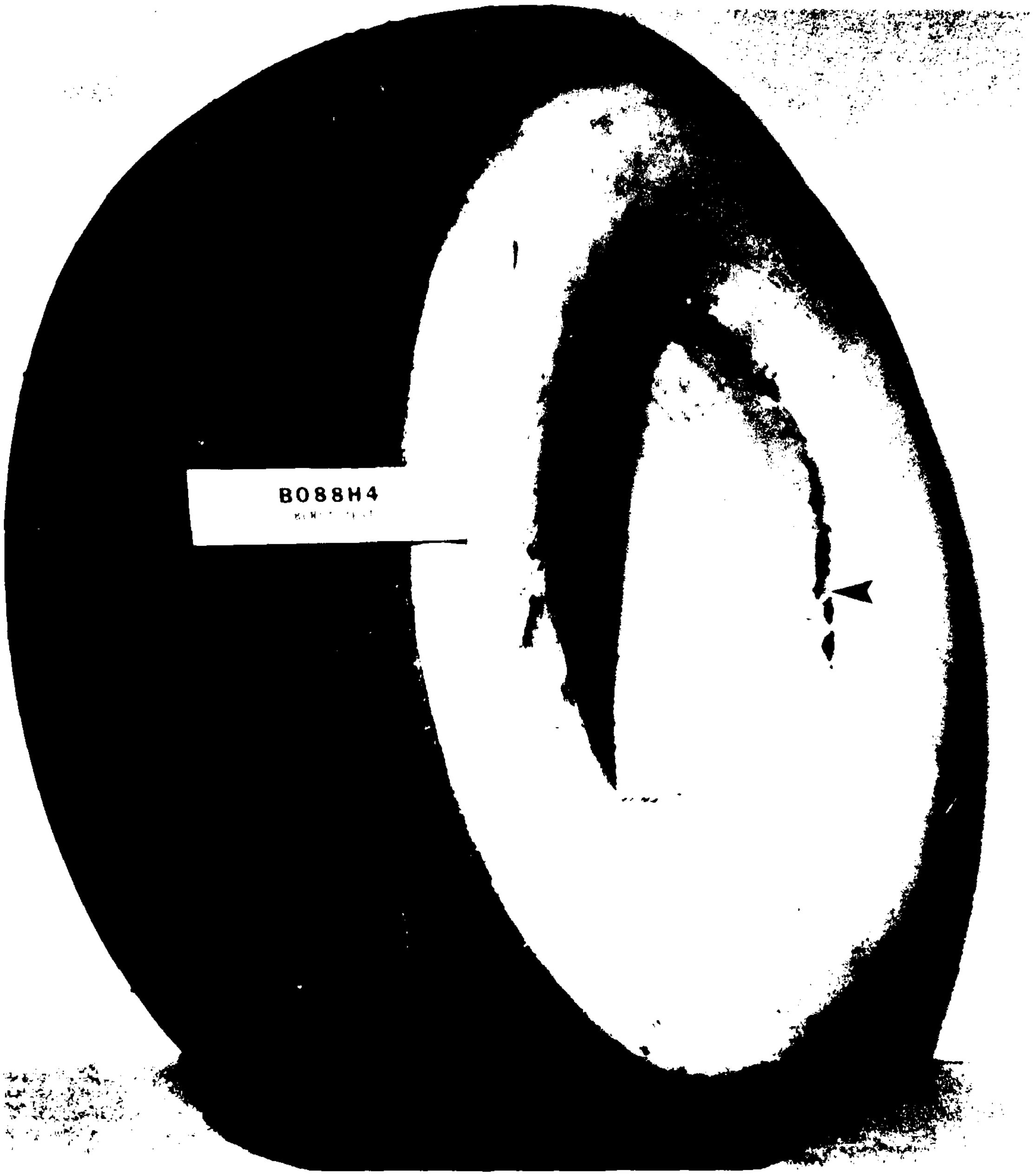


Figure 73. Burst Test Integral Cast Tire (S/N B088H4)
Material Creep Failure-Bead @ 465 PSIG

Figure 74. Burst Test Integral Cast Tire (S/N B08815)
Material Creep Failure-Sidewall @ 295 PSIG

Figure 75. Burst Test Integral Cast Tire (S/N B088J5)
Material Creep Failure-Belt Edge @ 345 PSIG

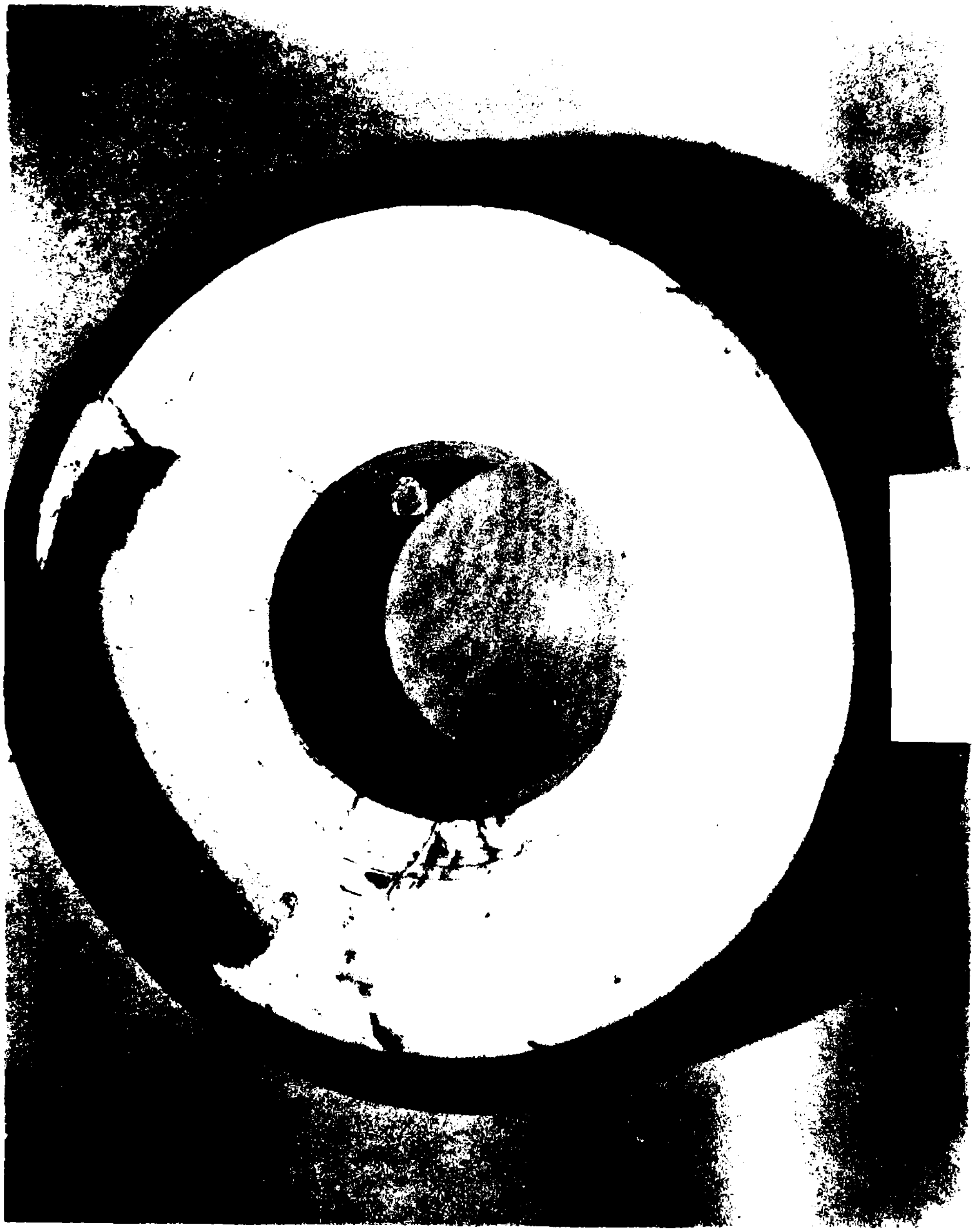


Figure 76. Burst Test Integral Cast Tire (S/N B098L5)
Brittle Failure-Sidewall @ 325 PSIG

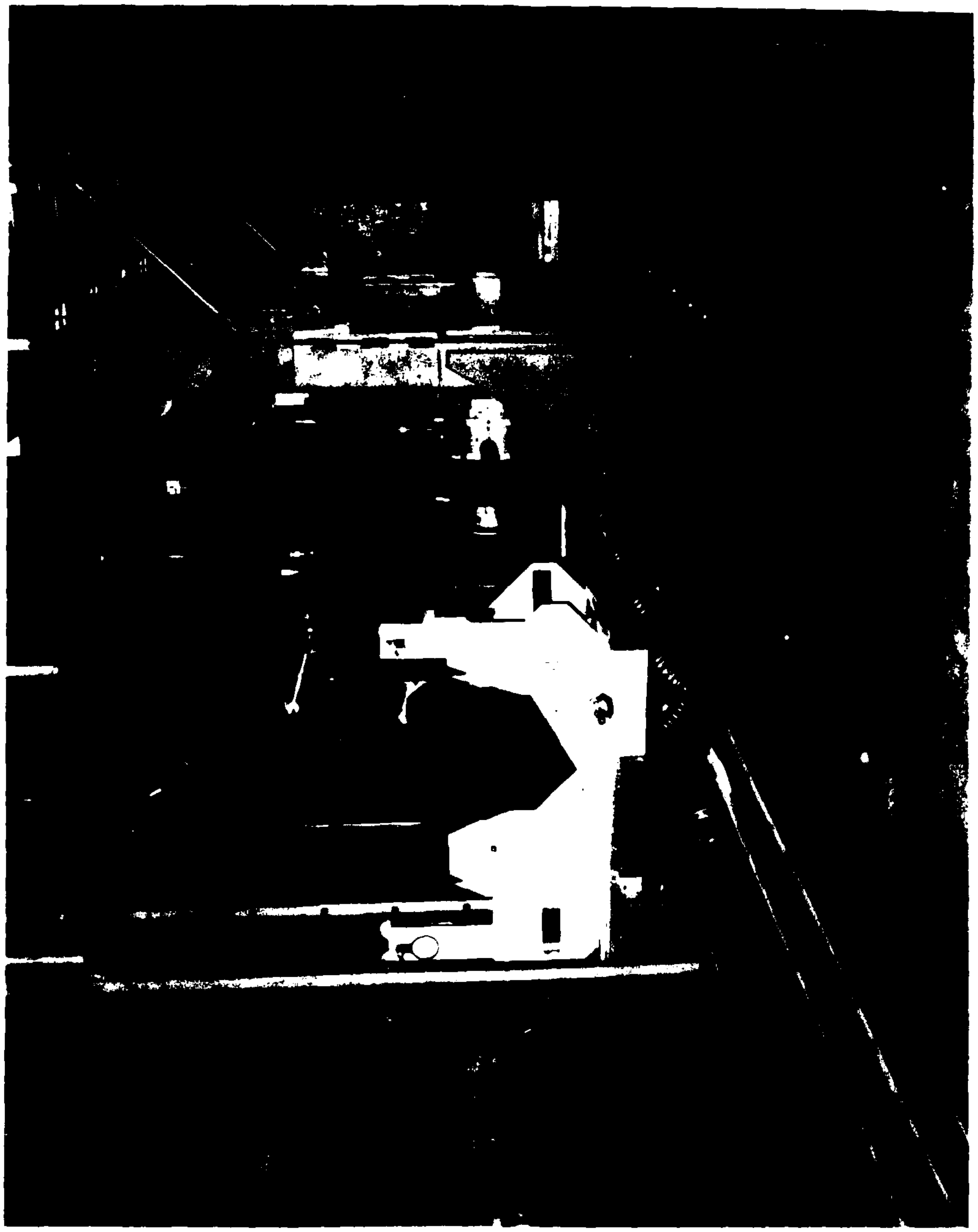


Figure 77. Lateral Force and Aligning Torque Test-Set Up, Tire Force Machine

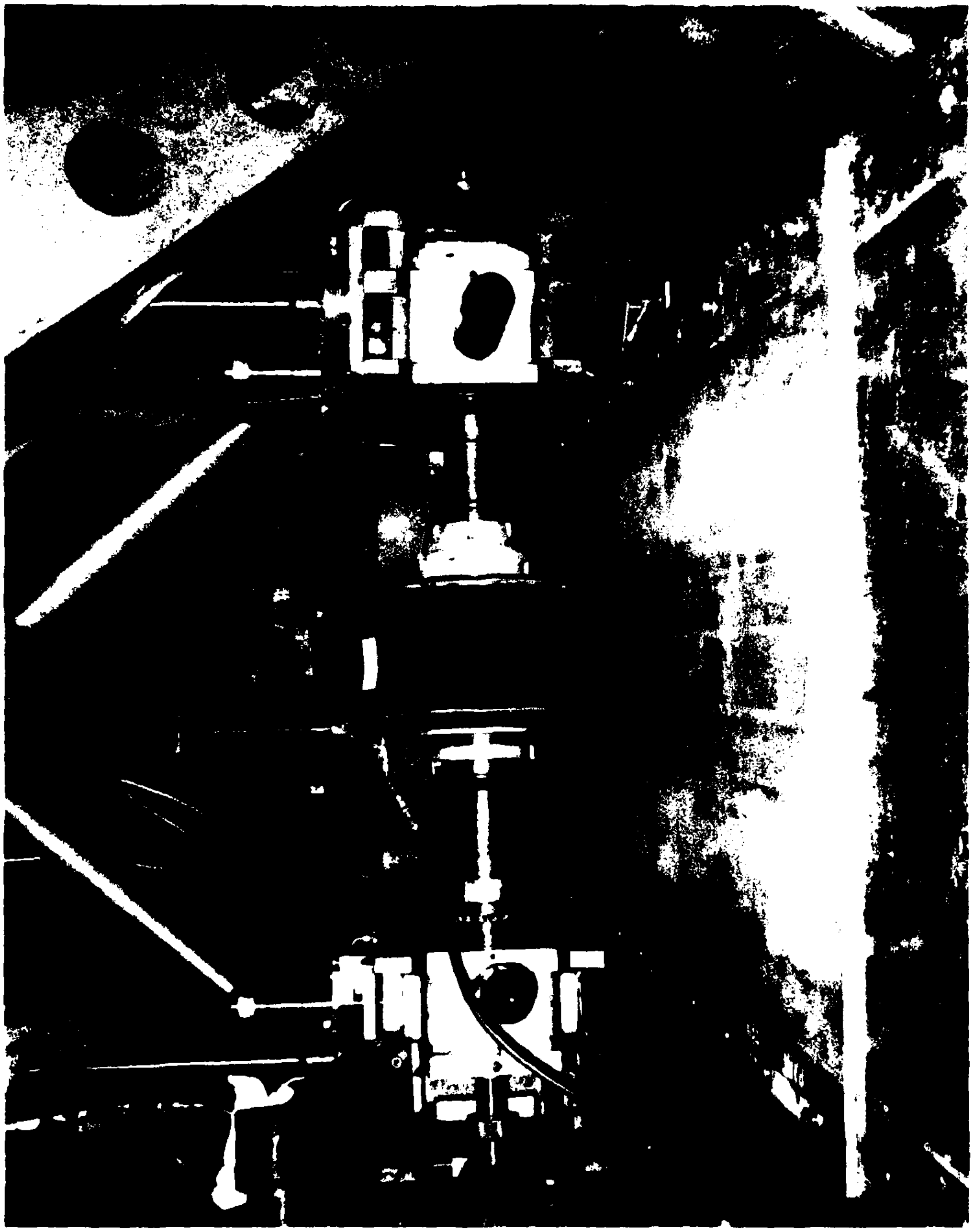


Figure 78. Lateral Force and Aligning Torque Test-Set Up, Tire Force Machine @ 6° Slip Angle

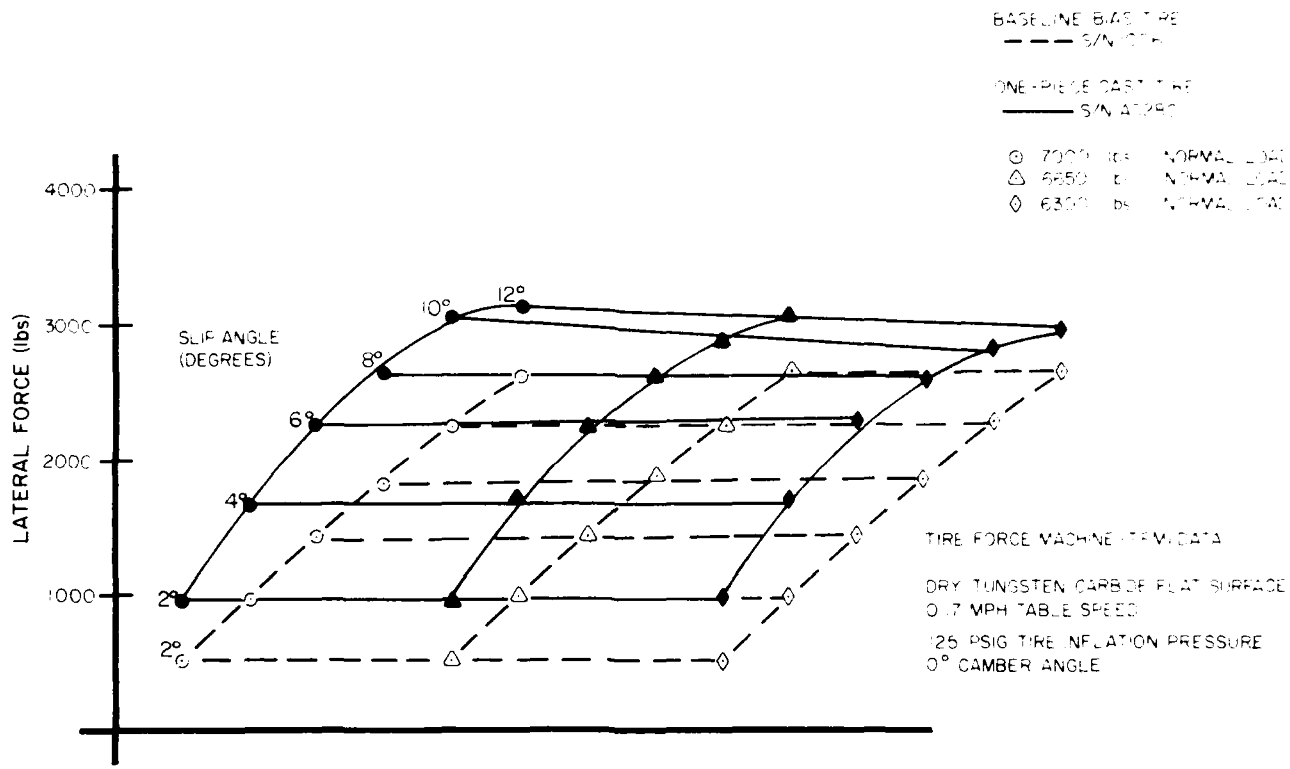


Figure 79. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

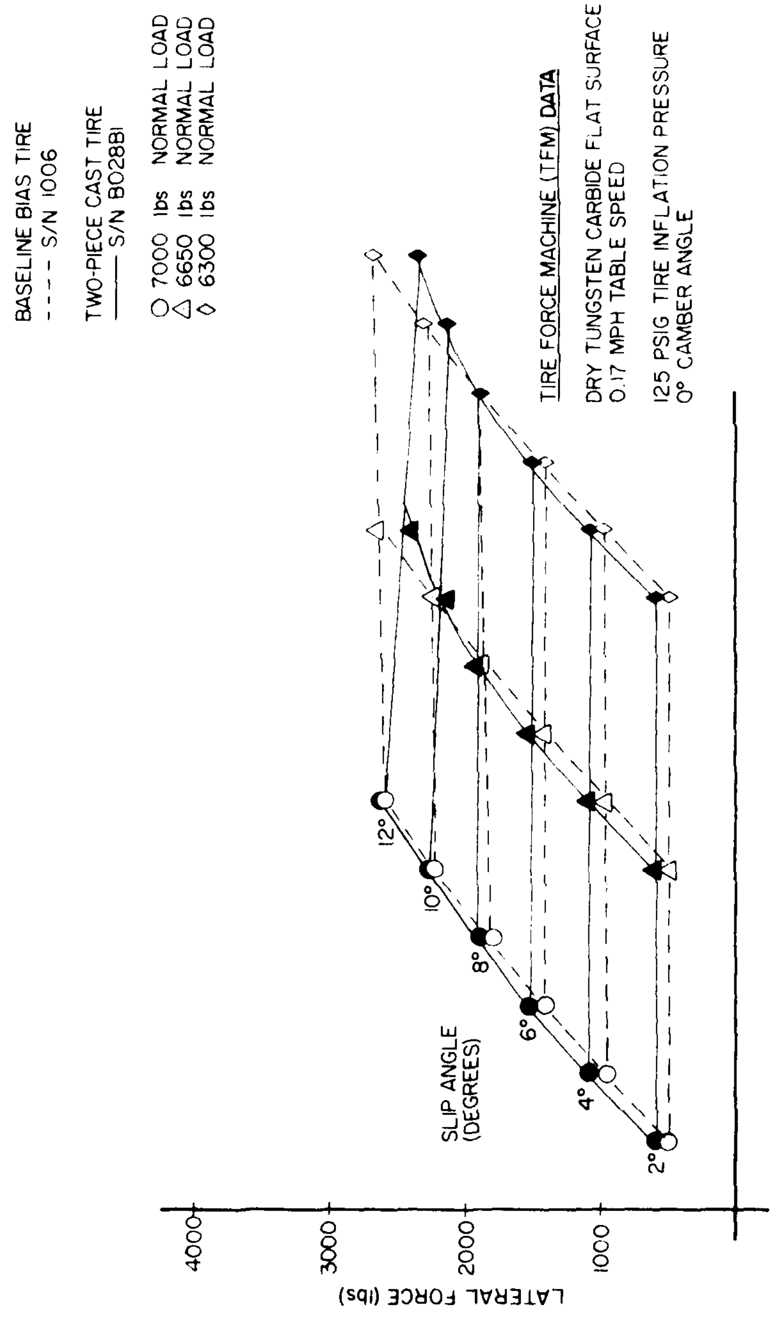


Figure 80. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

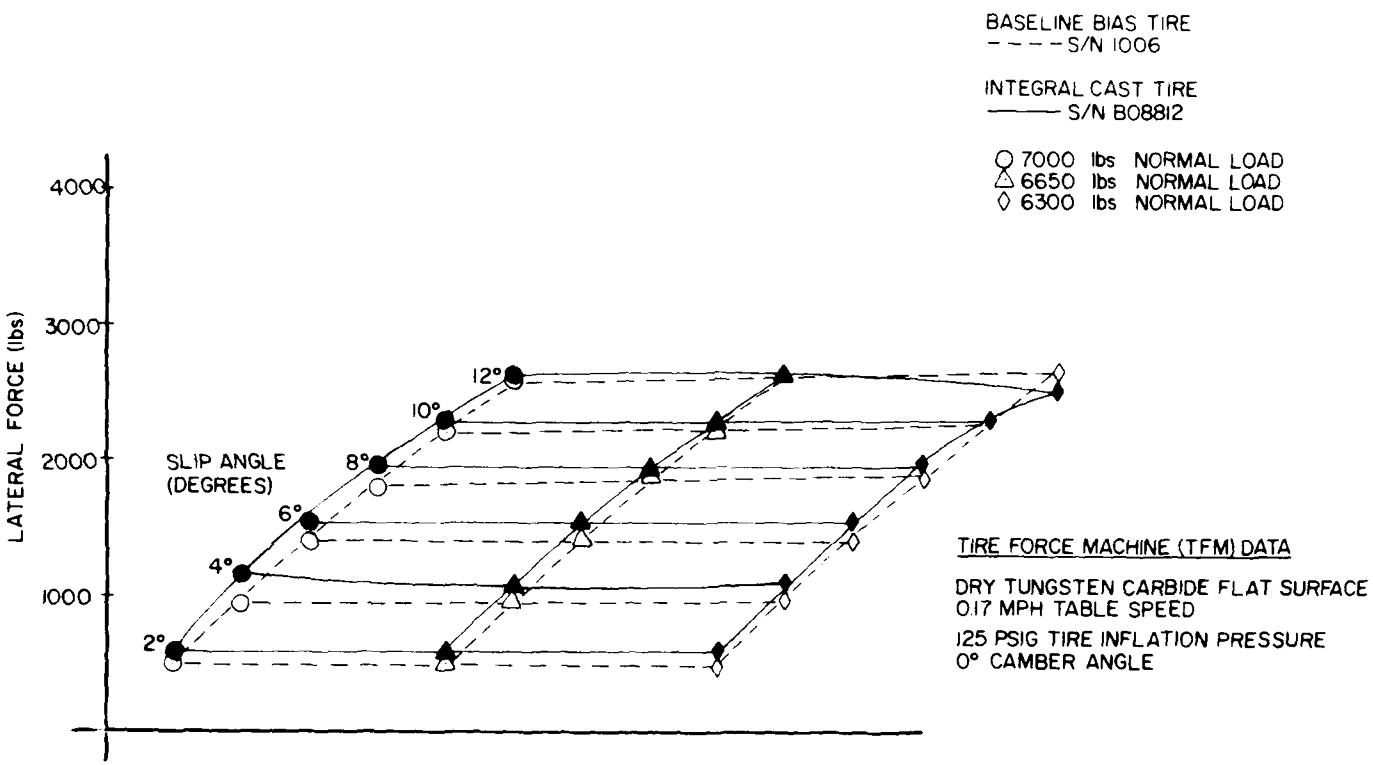


Figure 81. Lateral Force Vs Slip Angle and Vertical Load
(Carpet Plots)

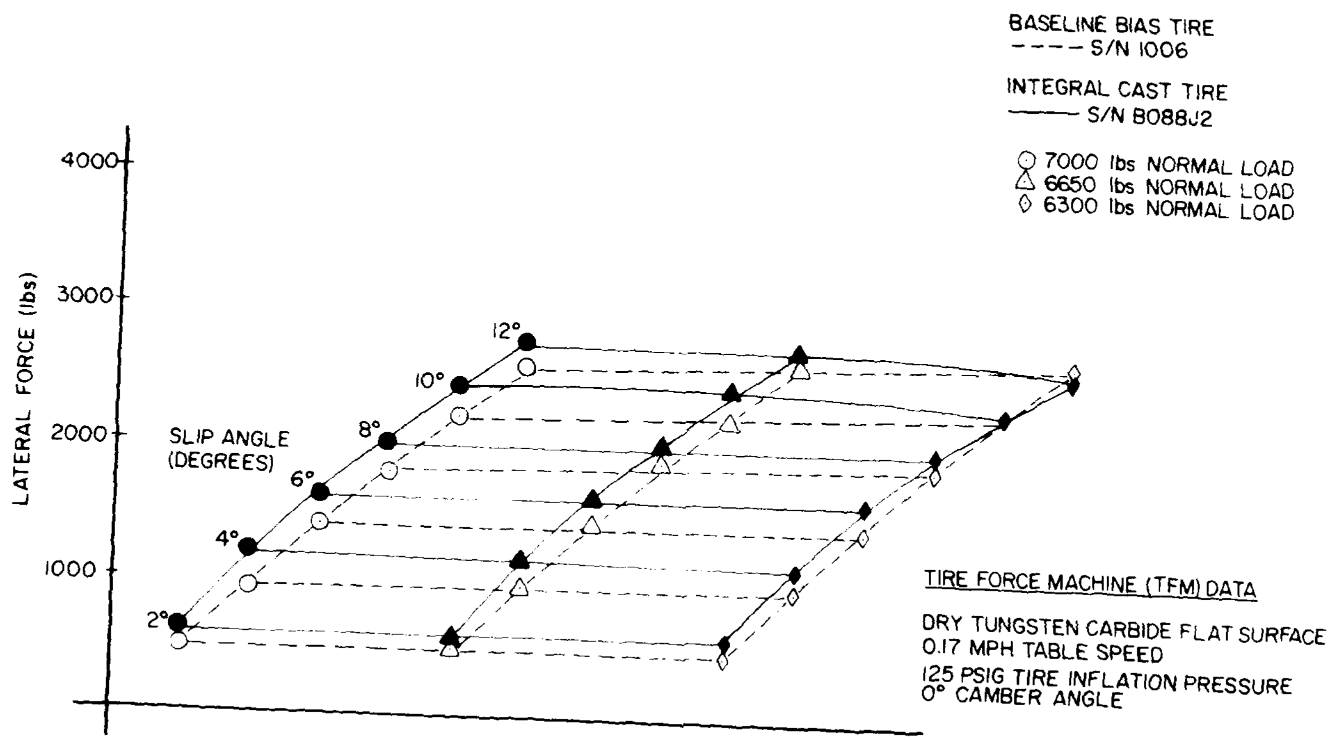


Figure 82. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

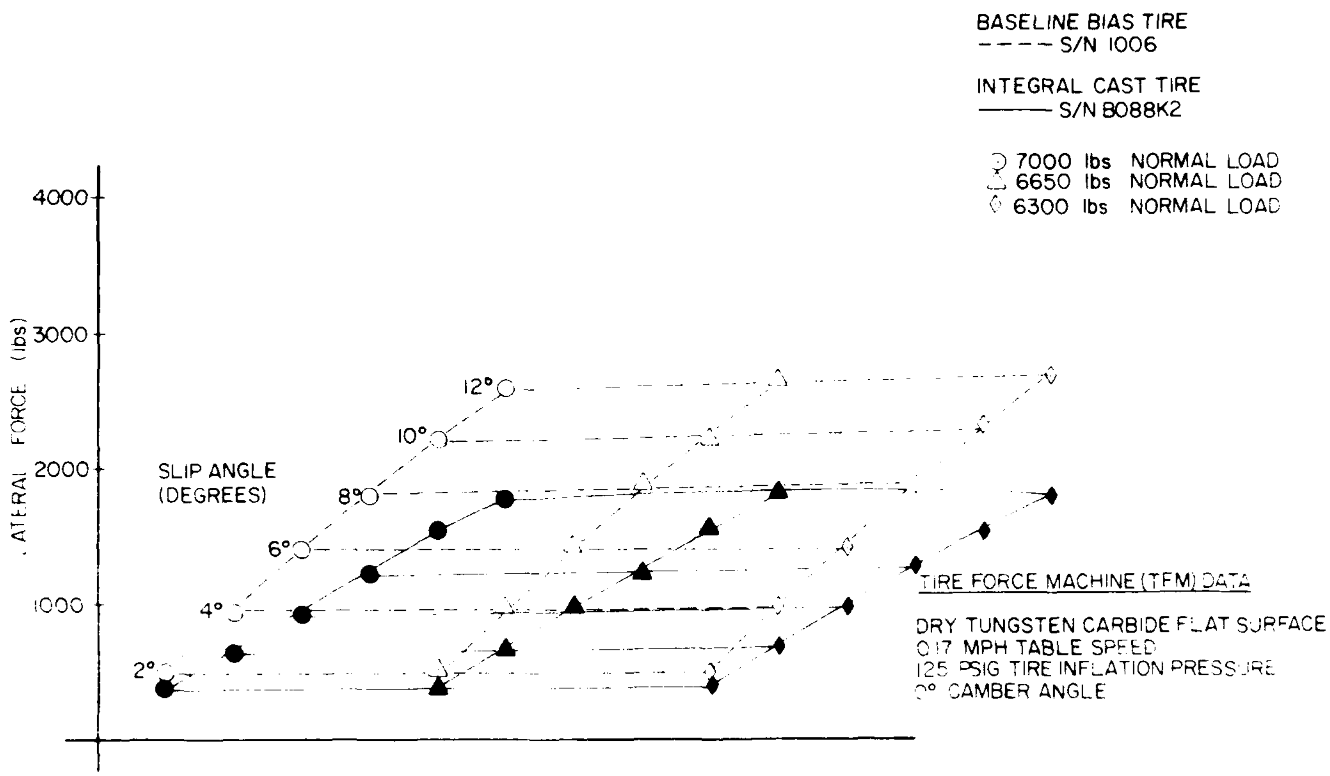


Figure . Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

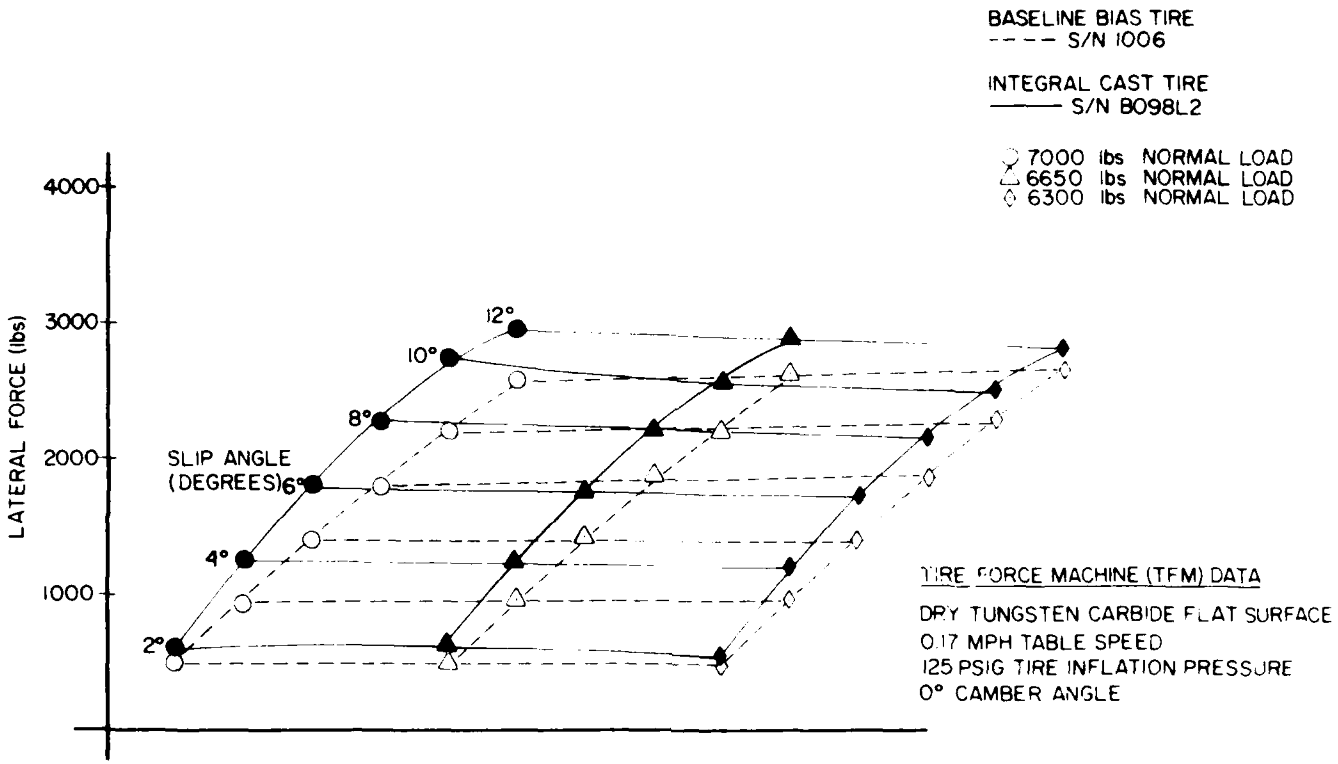


Figure 84. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

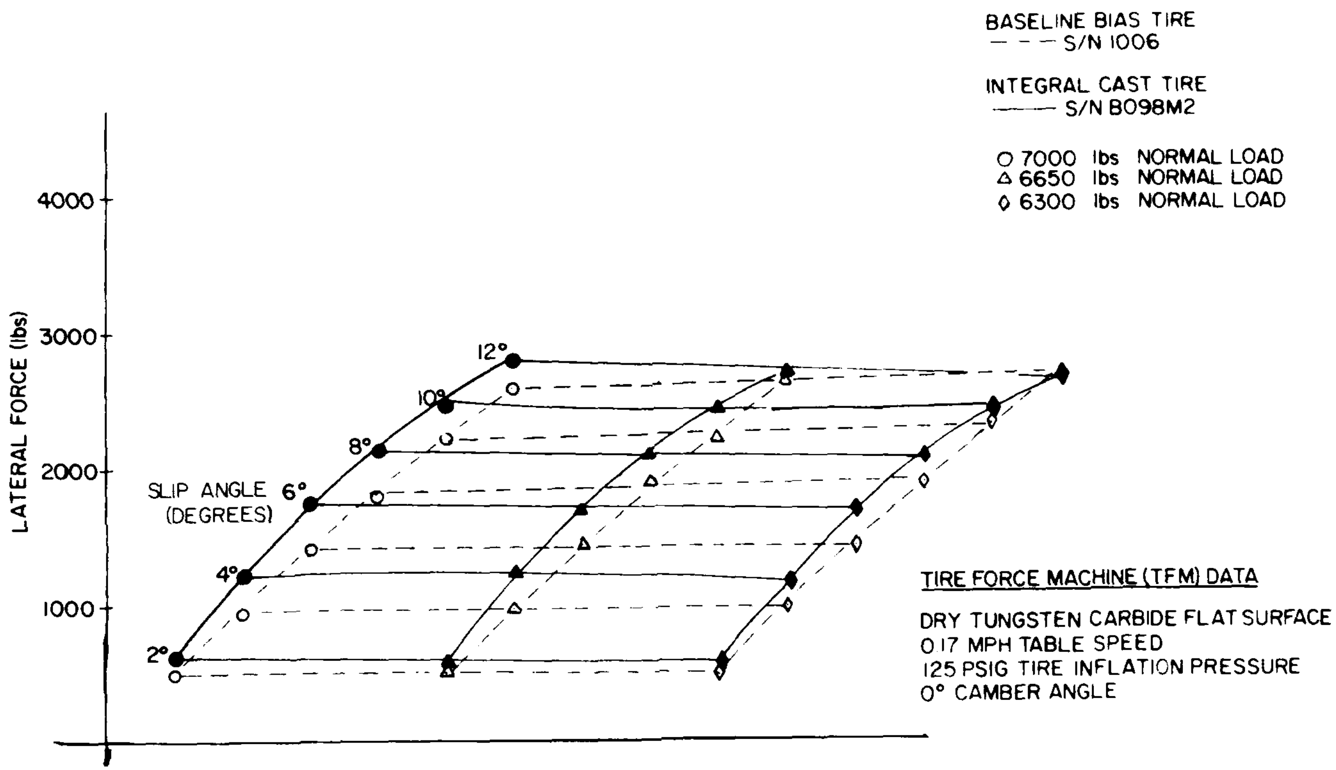
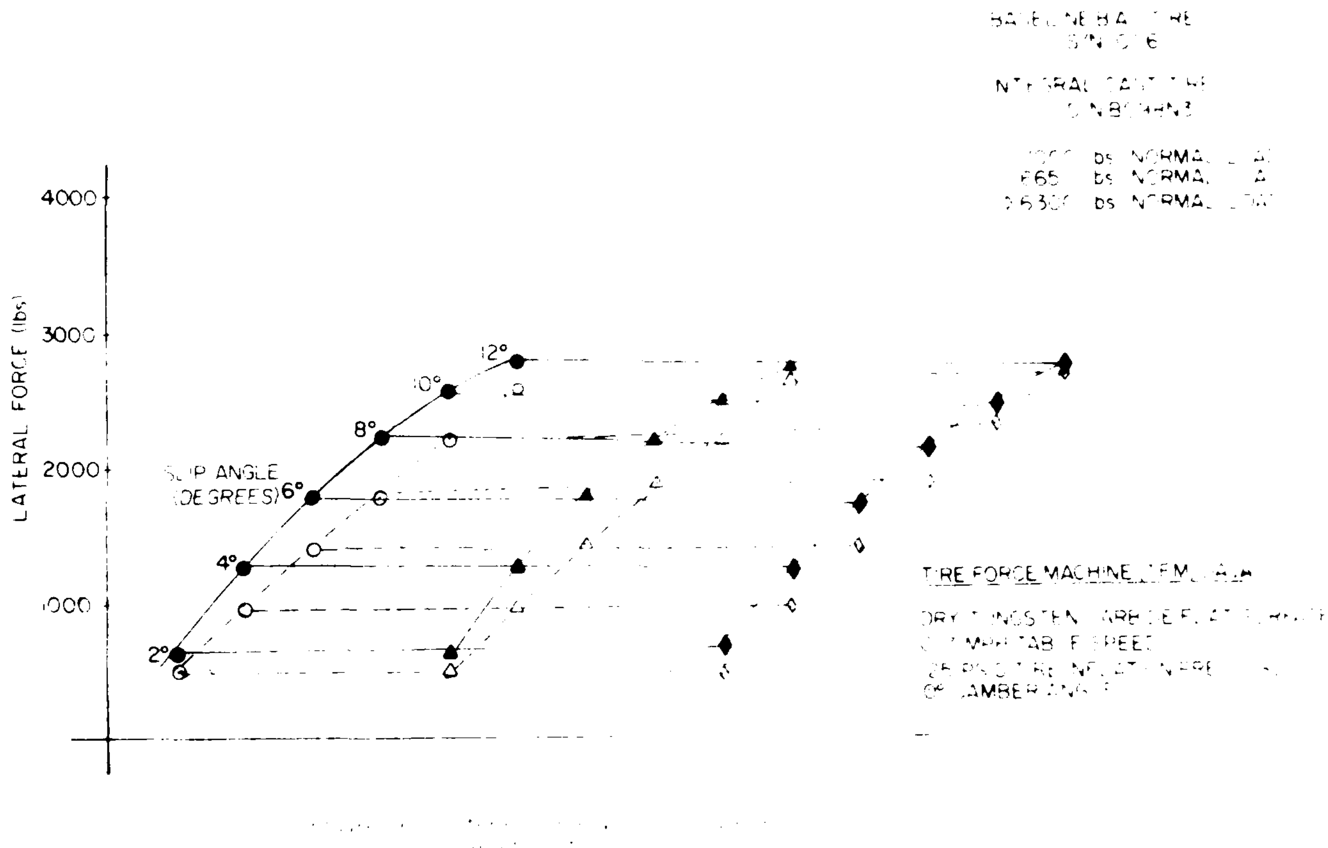
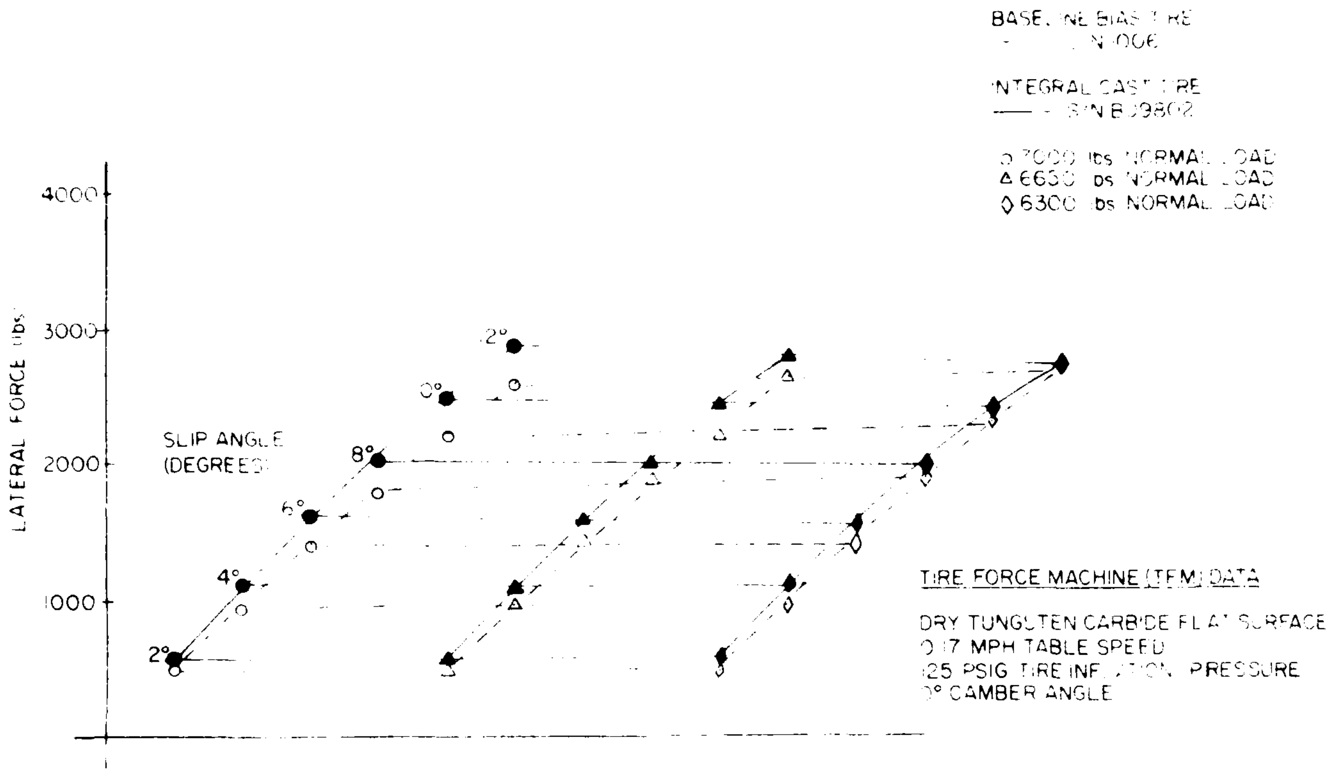


Figure 85. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)


LATERAL FORCE (lbs)
4000
3000
2000
1000
SLIP ANGLE
(DEGREES)
2°
4°
6°
8°
10°
12°
TIRE FORCE MACHINE


BASELINE BIAS TIRE
INTEGRAL CAST TIRE
7000 lbs NORMAL LOAD
6650 lbs NORMAL LOAD
6300 lbs NORMAL LOAD
LATERAL FORCE (lbs)
4000
3000
2000
1000
SLIP ANGLE (DEGREES)
2°
4°
6°
8°
10°
12°
TIRE FORCE MACHINE (TFM) DATA
DRY TUNGSTEN CARBIDE FLAT SURFACE
0.17 MPH TABLE SPEED
125 PSIG TIRE INFLATION PRESSURE
0° CAMBER ANGLE

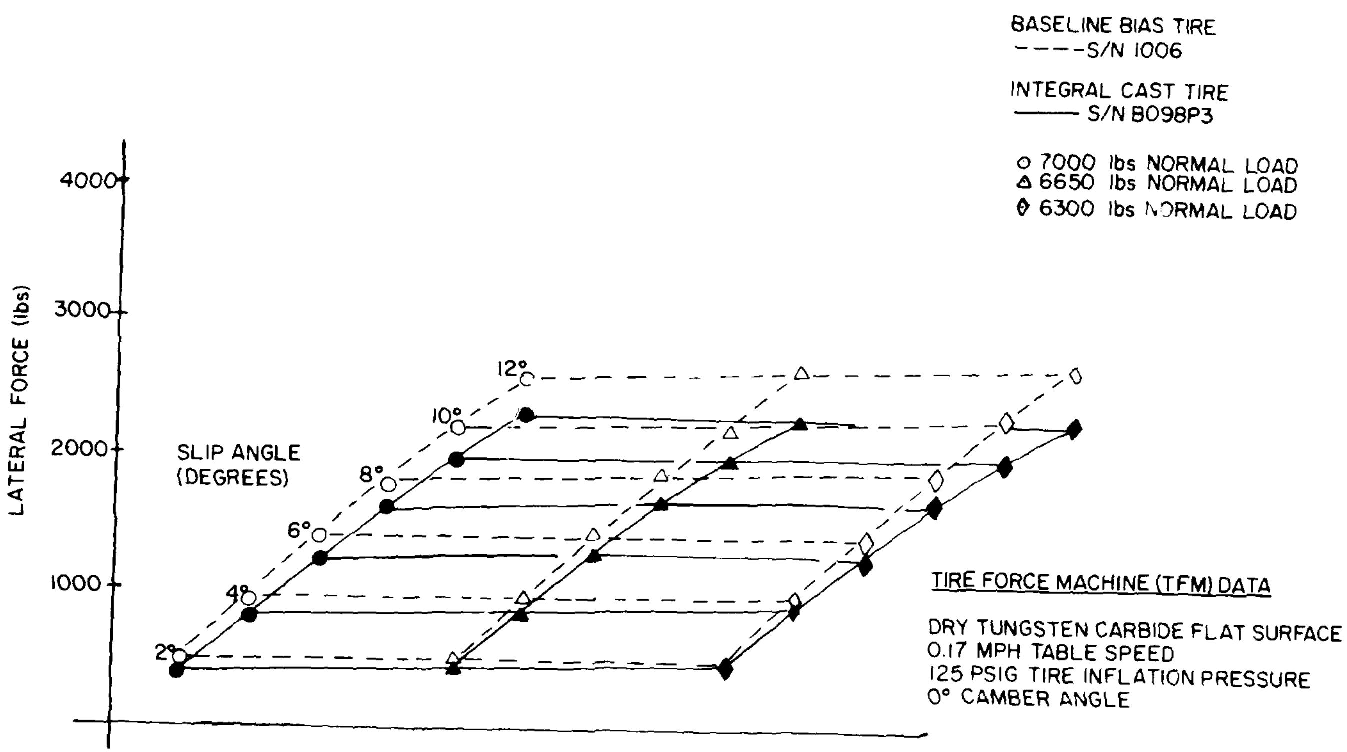


Figure 88. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

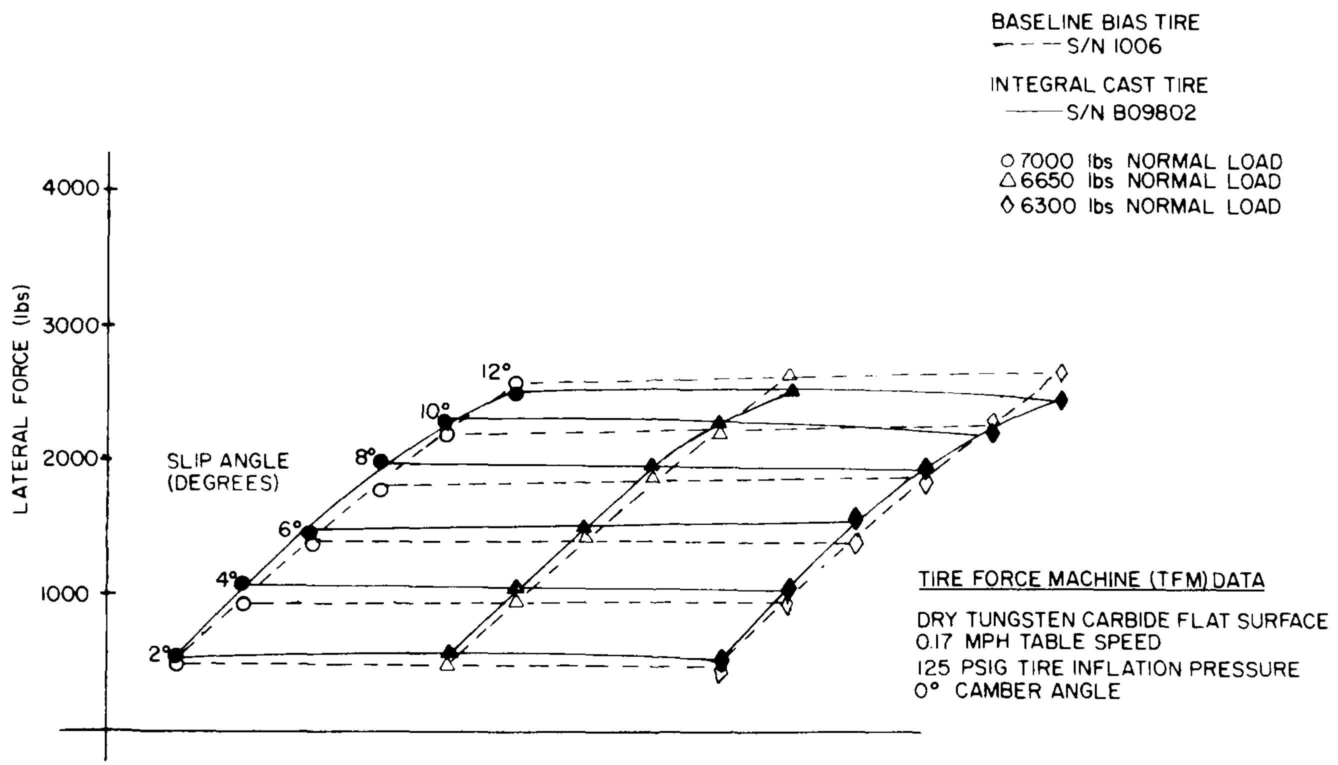


Figure 89. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

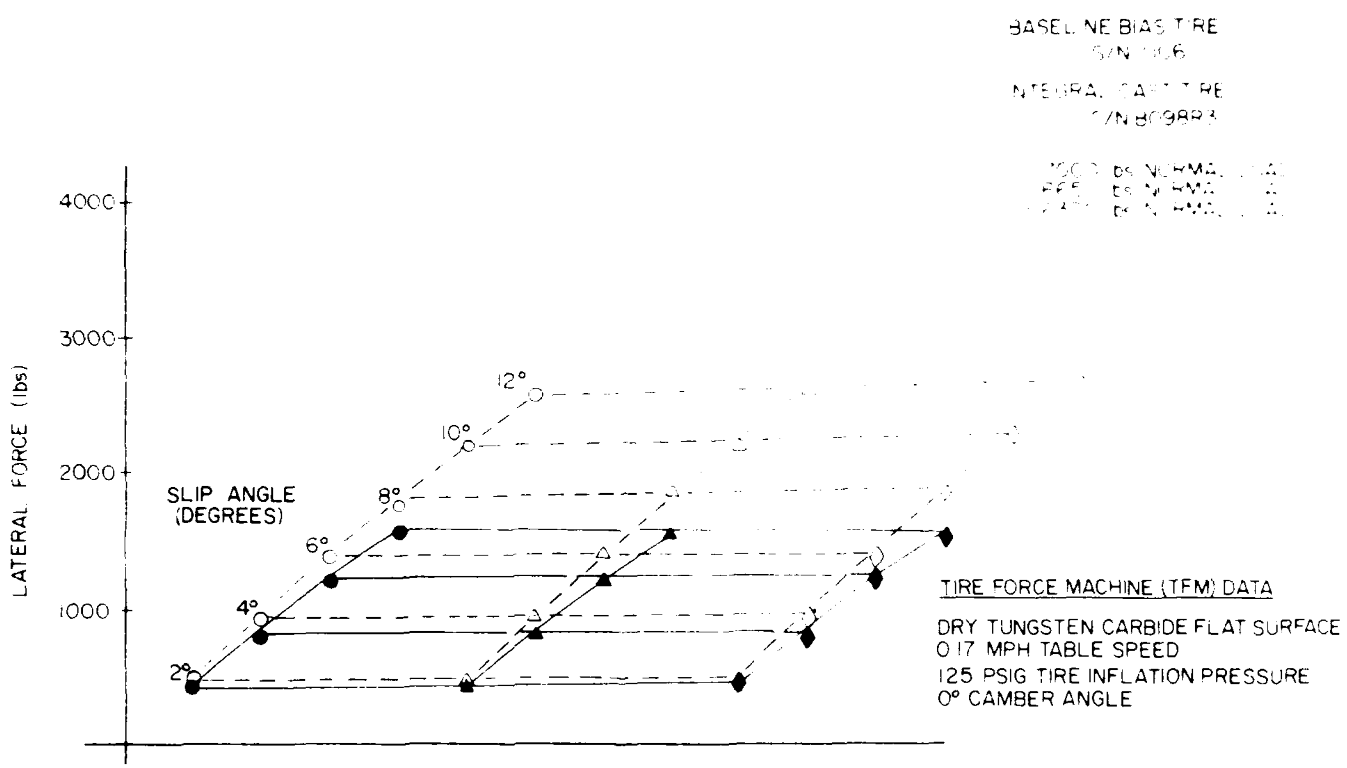
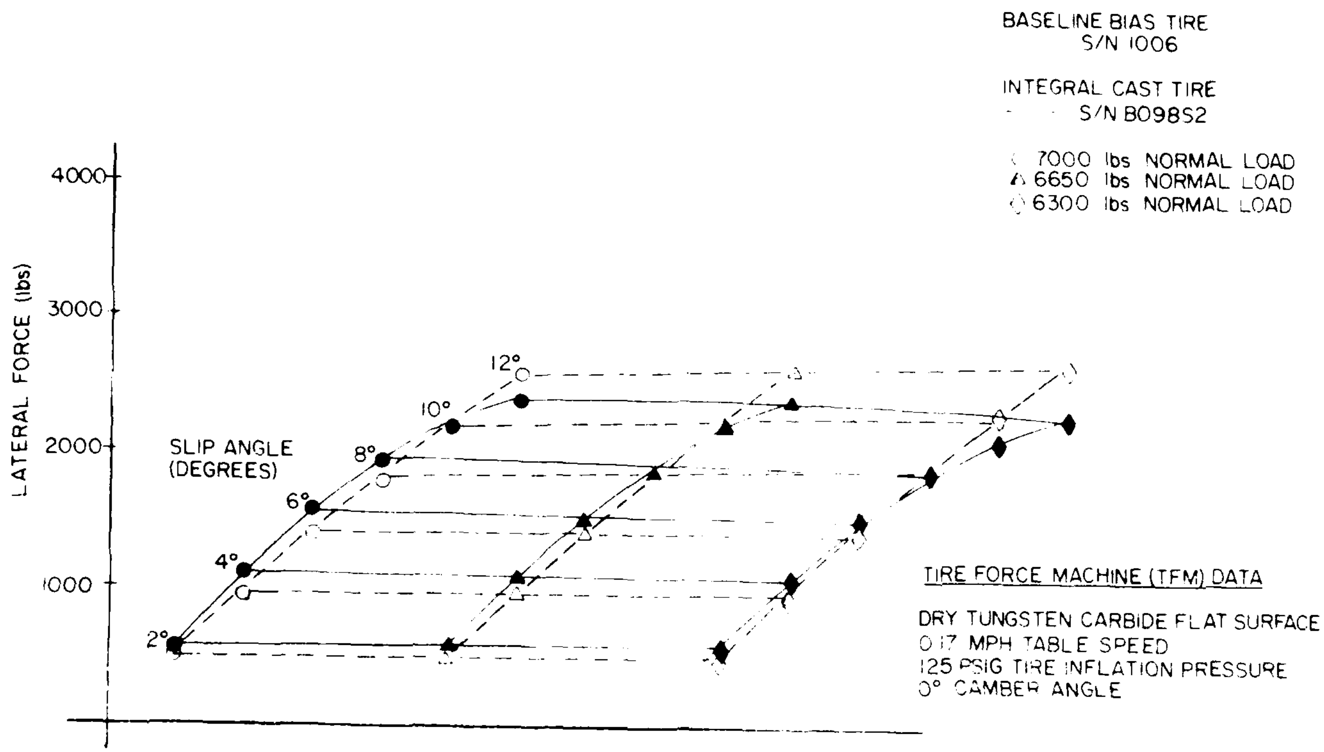


Figure 30. Lateral Force Vs Slip Angle and Vertical Load
(Carpet Plots)


BASELINE BIAS TIRE
S/N 1006
INTEGRAL CAST TIRE
S/N B09852
7000 lbs NORMAL LOAD
6650 lbs NORMAL LOAD
6300 lbs NORMAL LOAD
LATERAL FORCE (lbs)
4000
3000
2000
1000
SLIP ANGLE
(DEGREES)
2°
4°
6°
8°
10°
12°
TIRE FORCE MACHINE (TFM) DATA
DRY TUNGSTEN CARBIDE FLAT SURFACE
0.17 MPH TABLE SPEED
125 PSIG TIRE INFLATION PRESSURE
0° CAMBER ANGLE

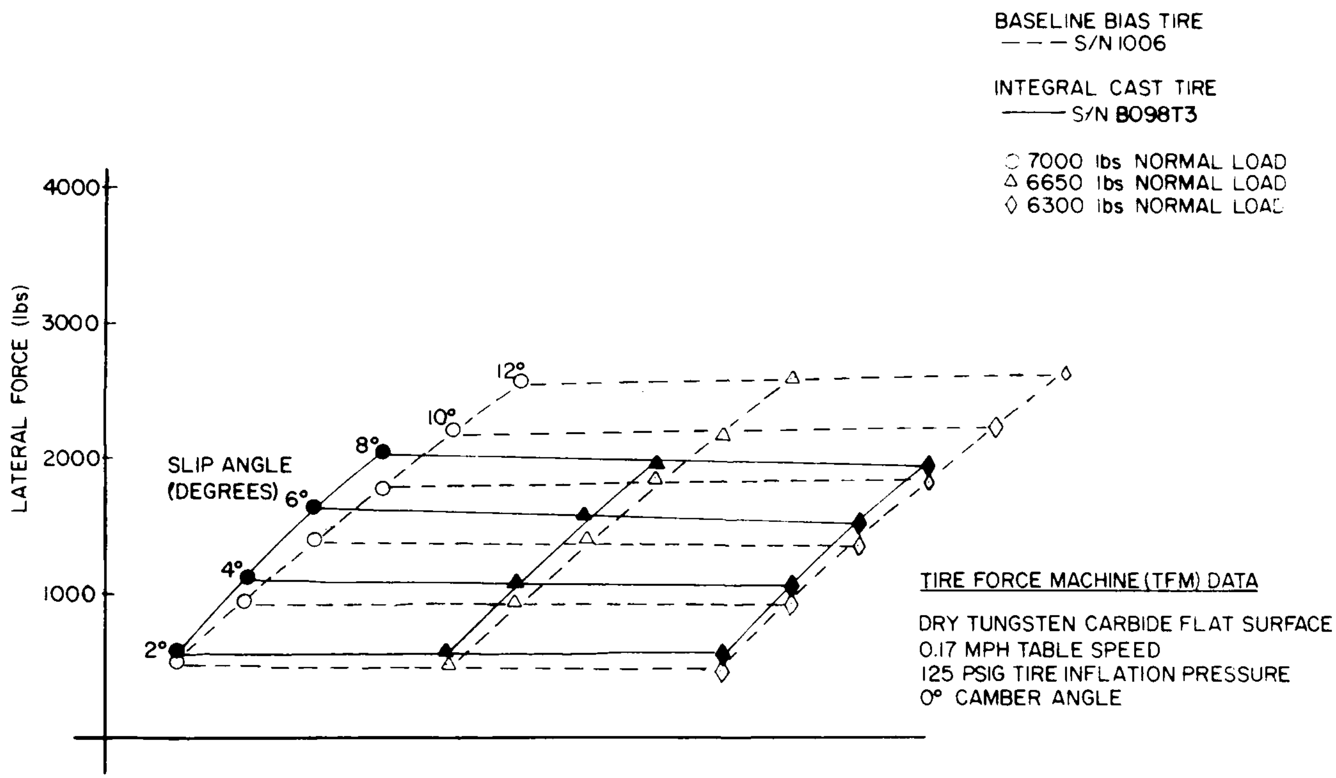


Figure 92. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

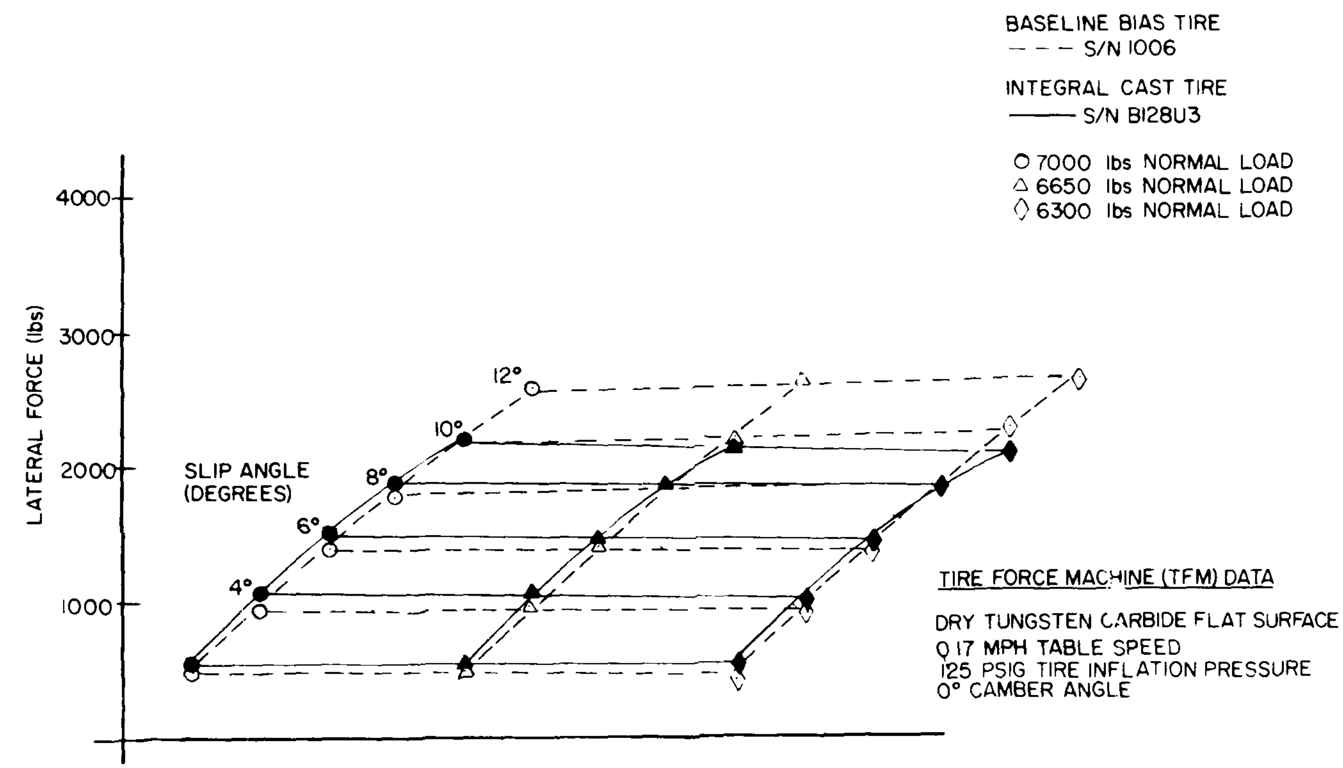
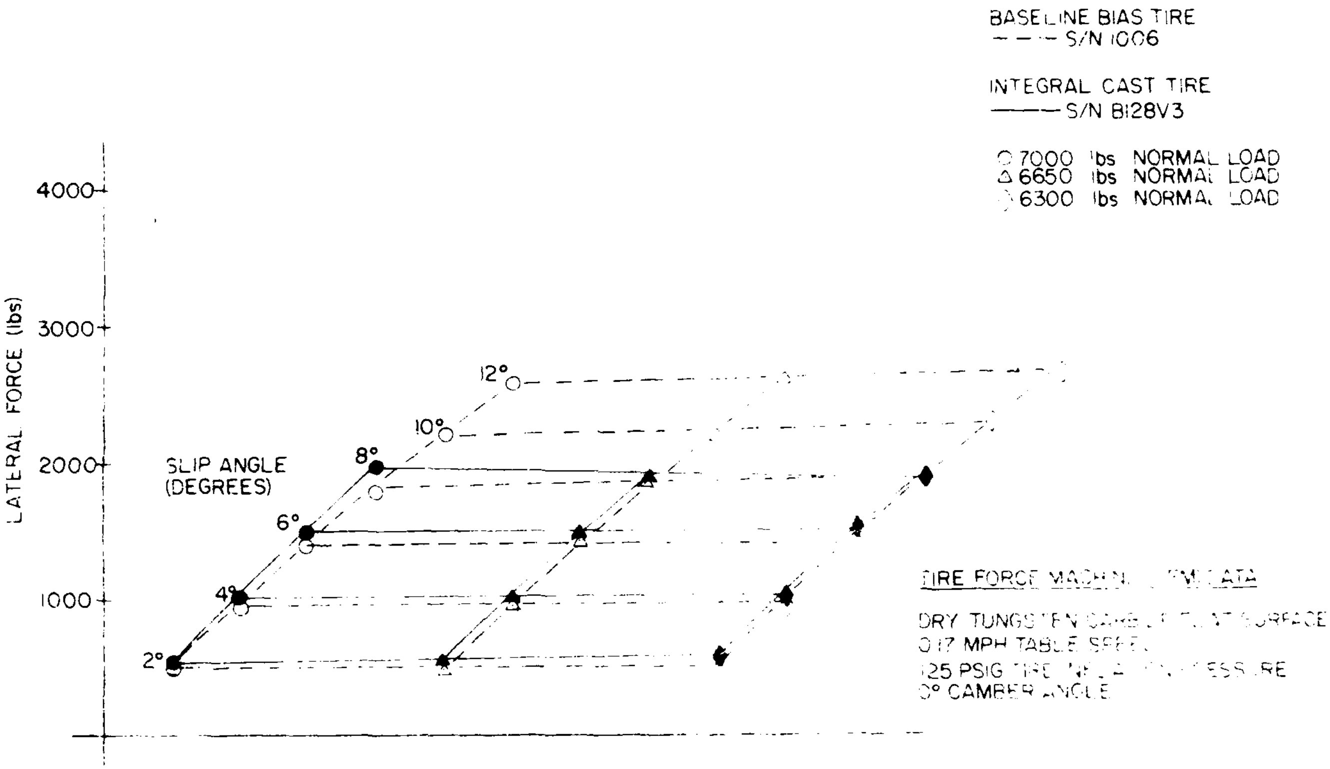
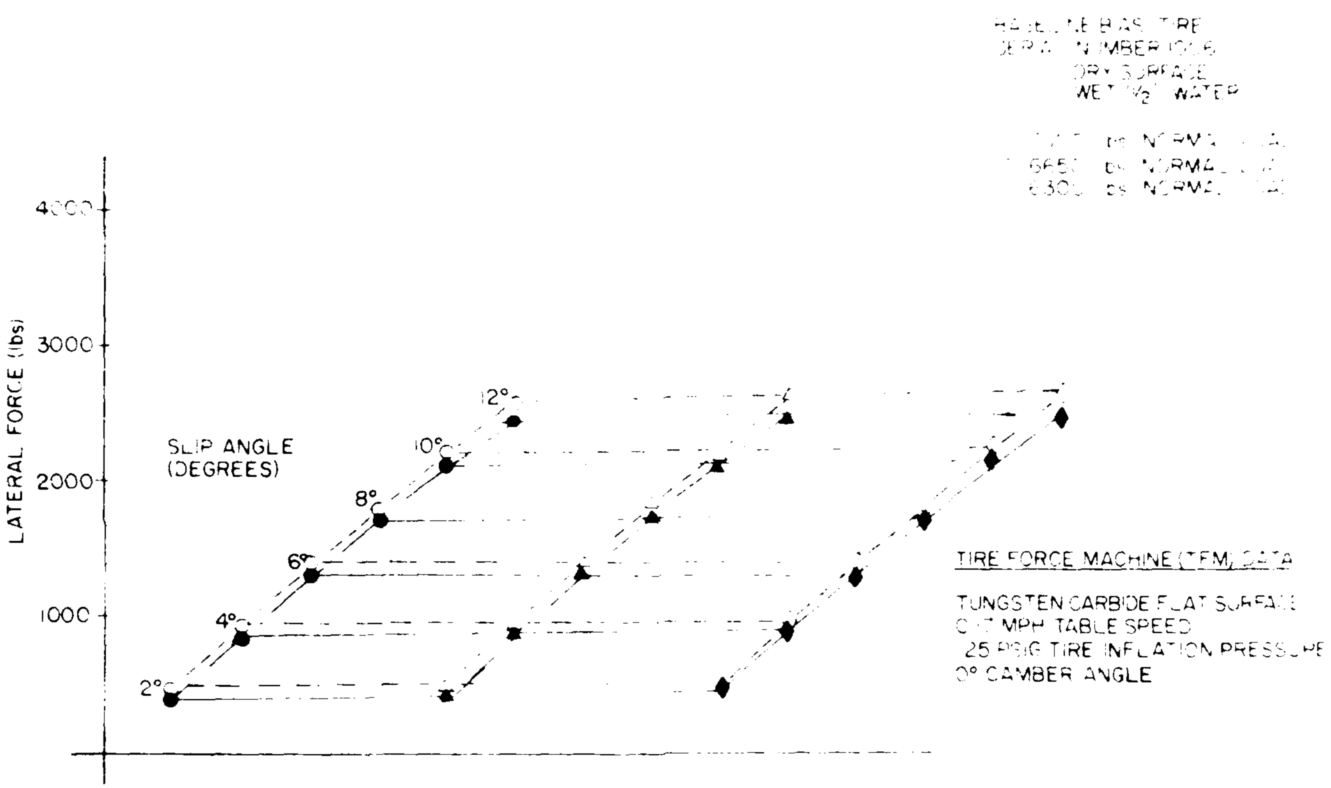


Figure 93. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)



BASELINE BIAS TIRE
S/N 1006
INTEGRAL CAST TIRE
S/N B128V3
7000 lbs NORMAL LOAD
6650 lbs NORMAL LOAD
6300 lbs NORMAL LOAD
LATERAL FORCE (lbs)
4000
3000
2000
1000
SLIP ANGLE
(DEGREES)
2°
4°
6°
8°
10°
12°
0.17 MPH TABLE SPEED
125 PSIG
0° CAMBER ANGLE


LATERAL FORCE (lbs)
4000
3000
2000
1000
SLIP ANGLE
(DEGREES)
2°
4°
6°
8°
10°
12°
DRY SURFACE
TIRE FORCE MACHINE (TFM) DATA
TUNGSTEN CARBIDE FLAT SURFACE
MPH TABLE SPEED
25 PSIG TIRE INFLATION PRESSURE
0° CAMBER ANGLE

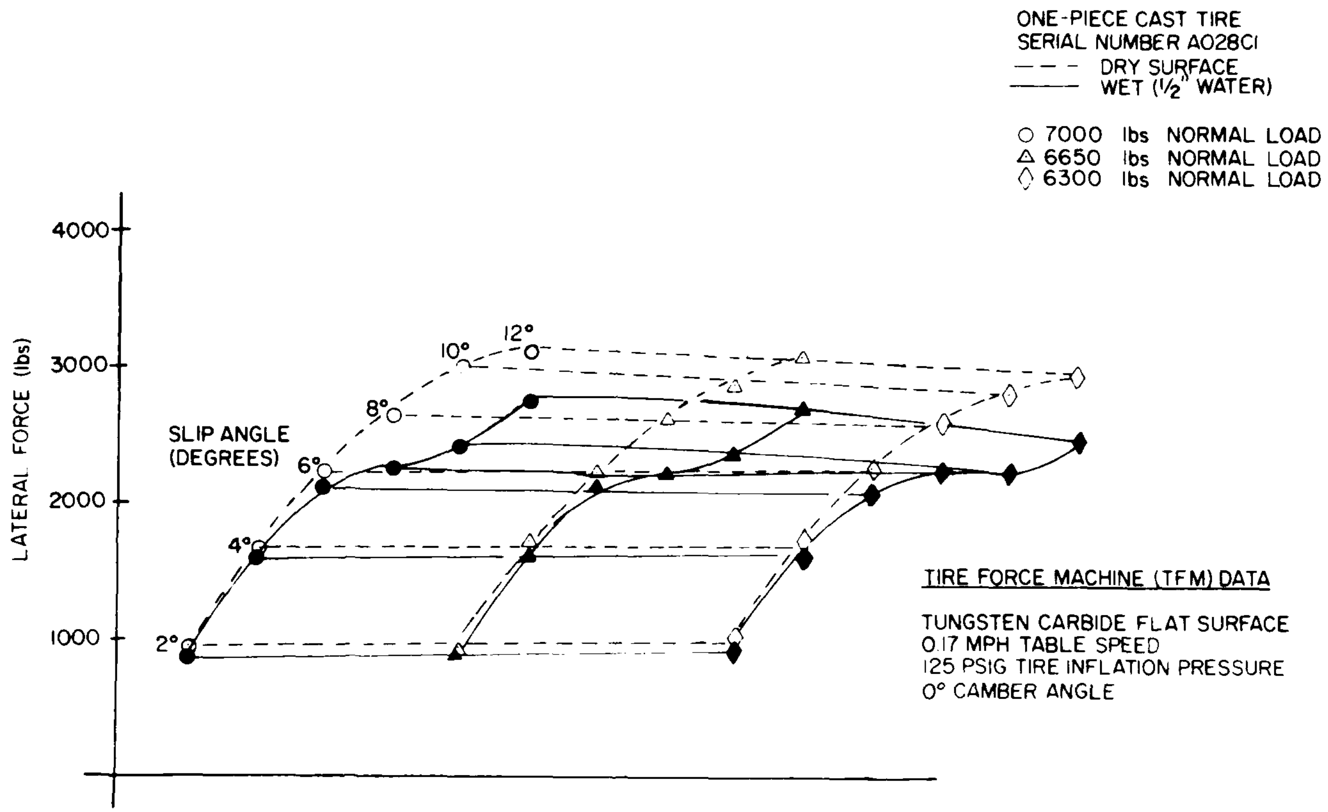


Figure 96. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

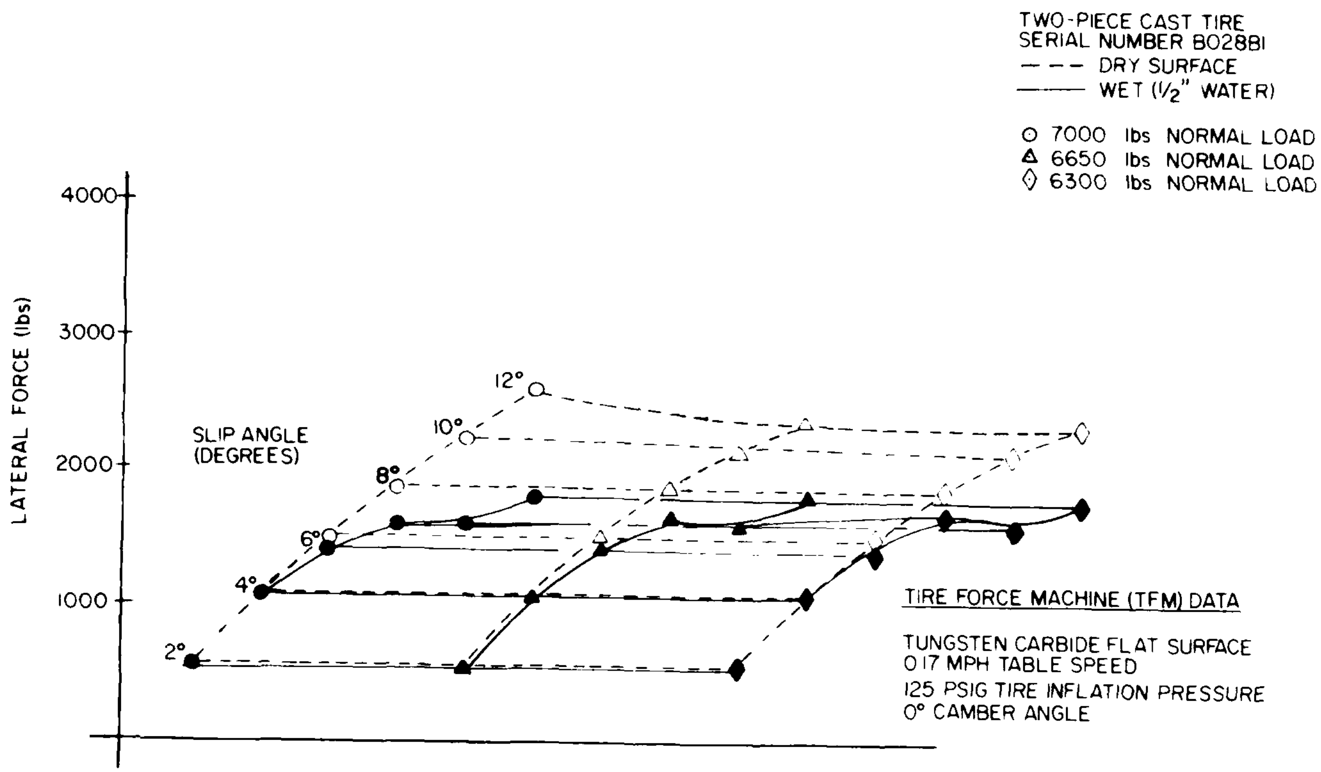


Figure 97. Lateral Force Vs Slip Angle and Vertical Load (Carpet Plots)

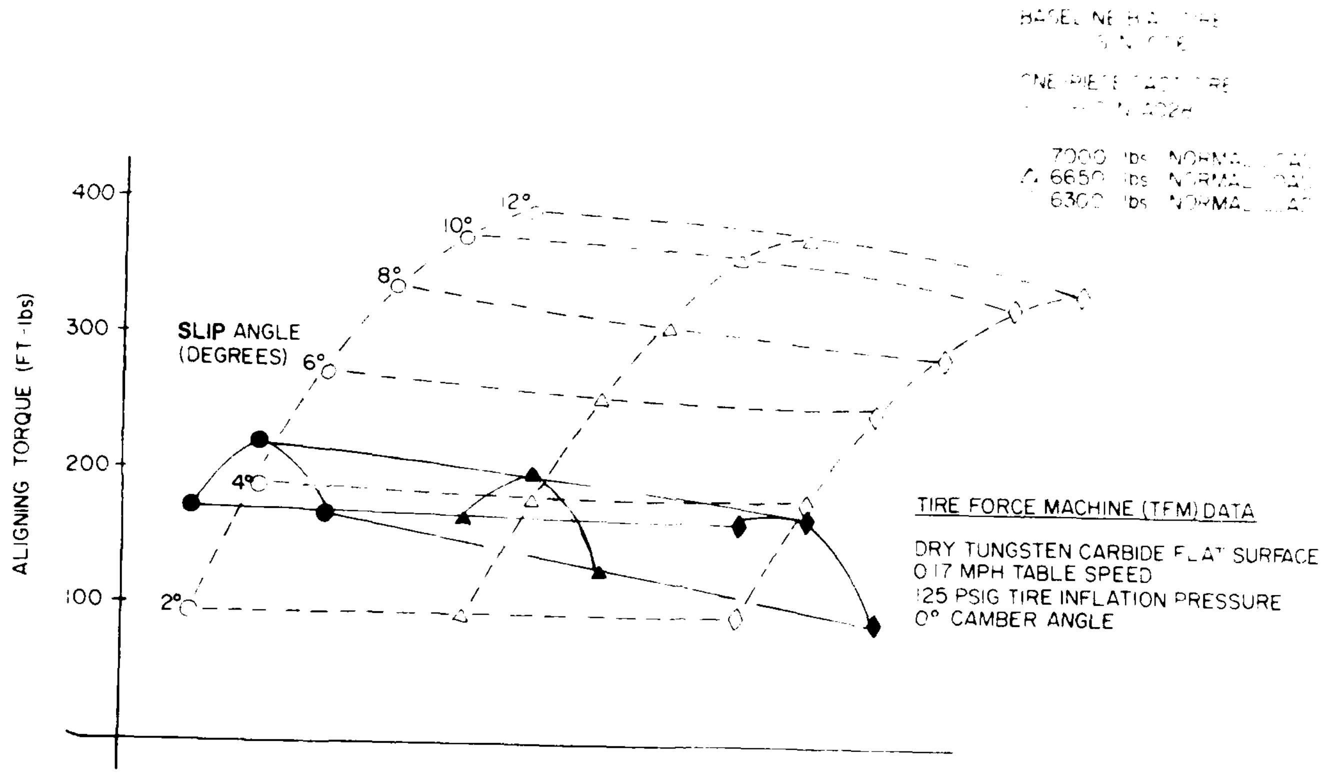


Figure 92. Aligning Torque Vs Slip Angle and Vertical Load
(Carpet Plots)

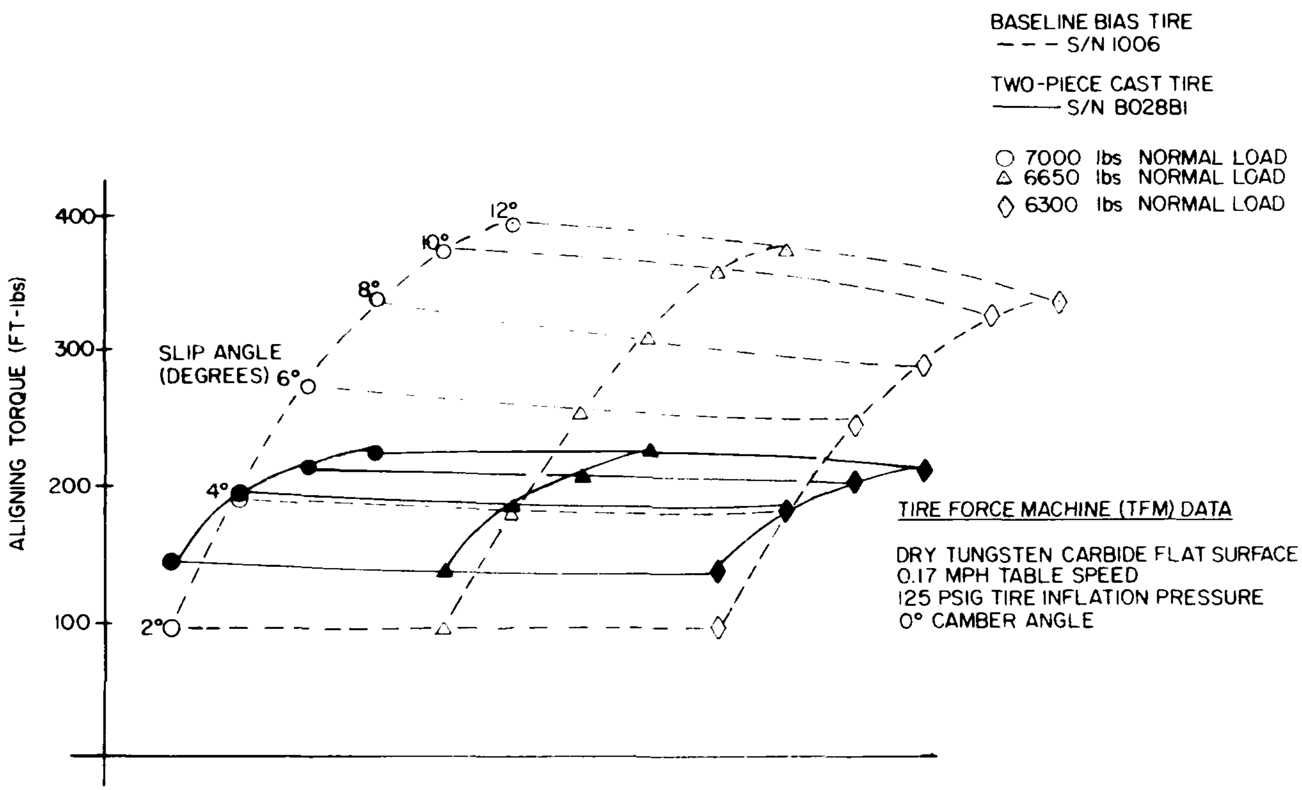


Figure 99. Aligning Torque vs Slip Angle and Vertical Load (Carpet Plot)

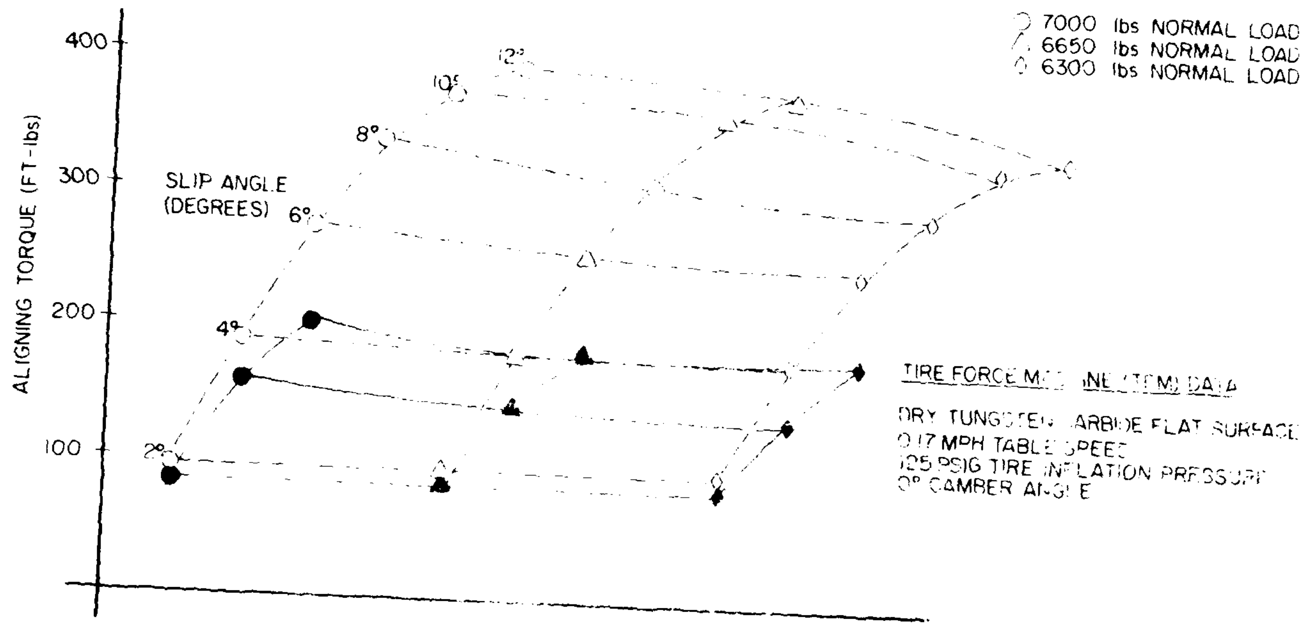
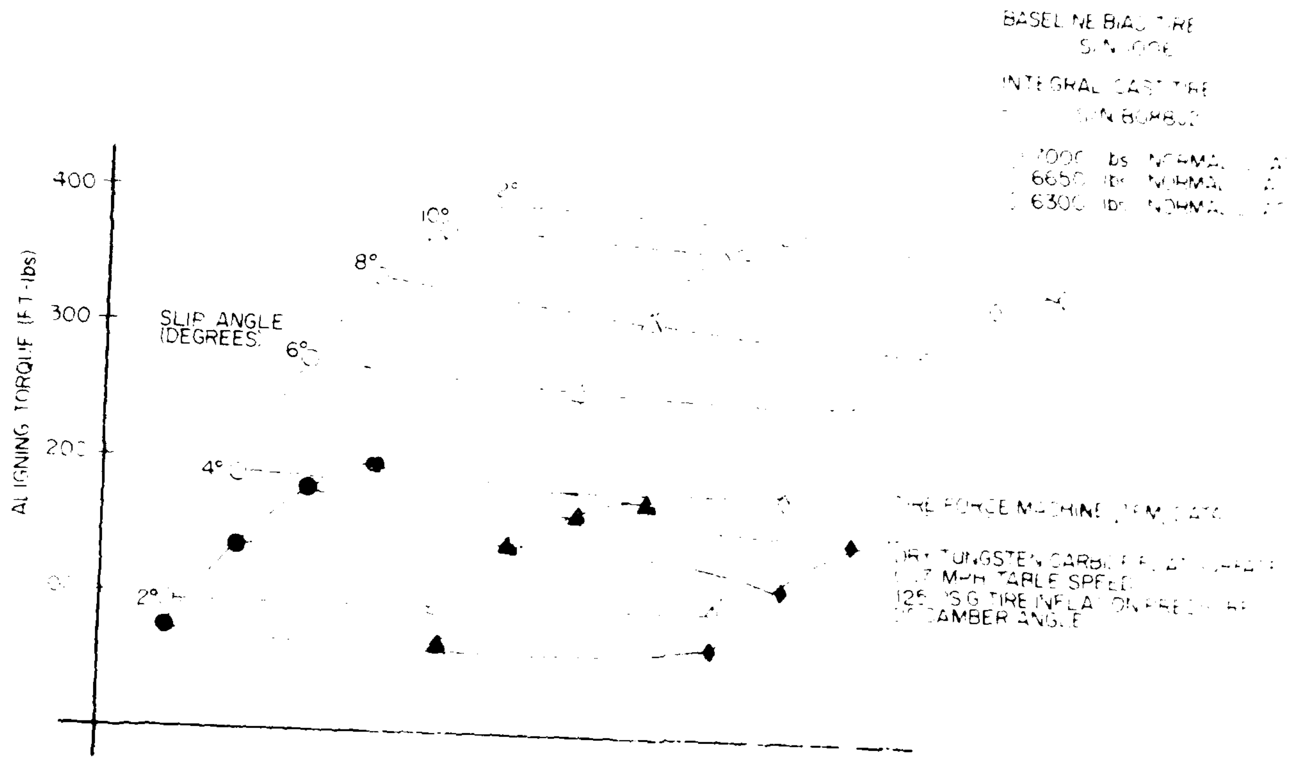


Figure 100. Aligning Torque vs Slip Angle and Vertical Load Carpet Plots


ALIGNING TORQUE (FT-lbs)
400
300
200
SLIP ANGLE (DEGREES)
2°
4°
6°
8°
10°
MPH TABLE SPEED
CAMBER ANGLE

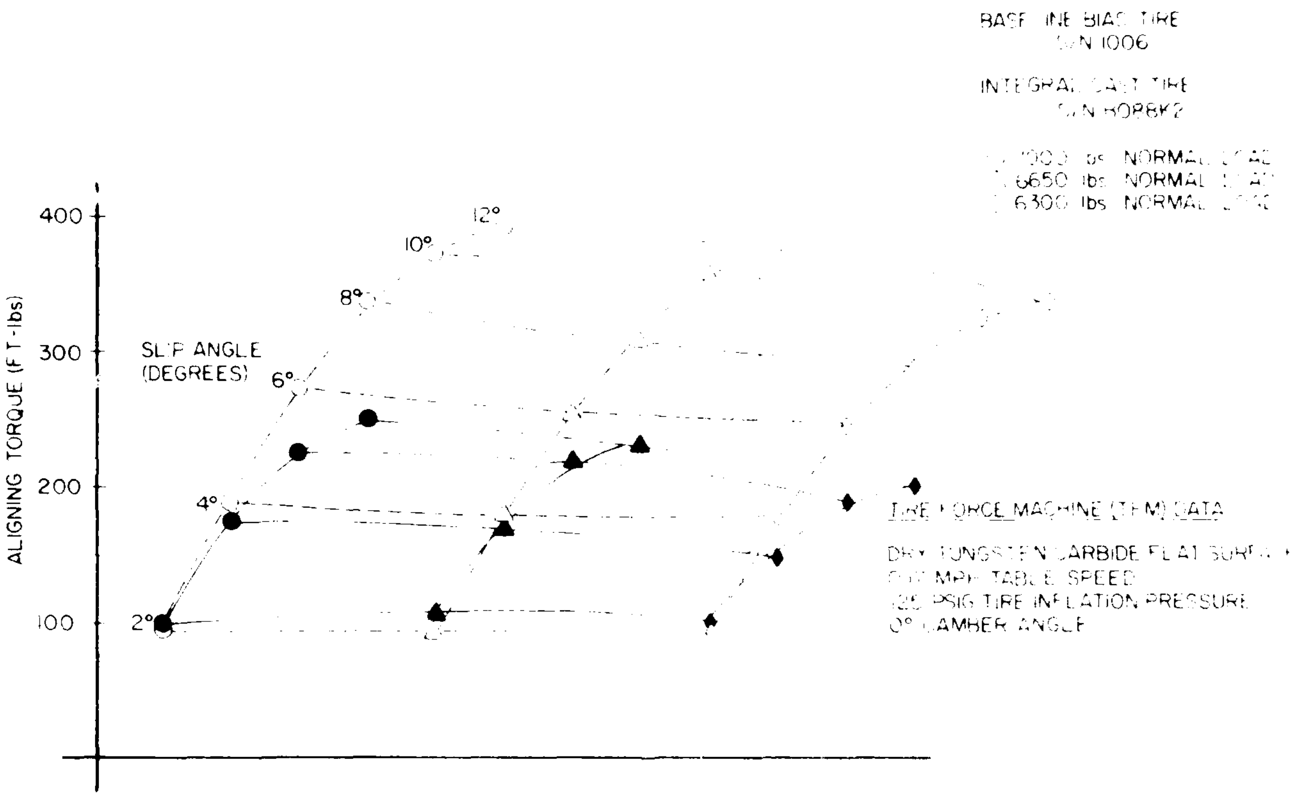


Figure [illegible]. Aligning [illegible]

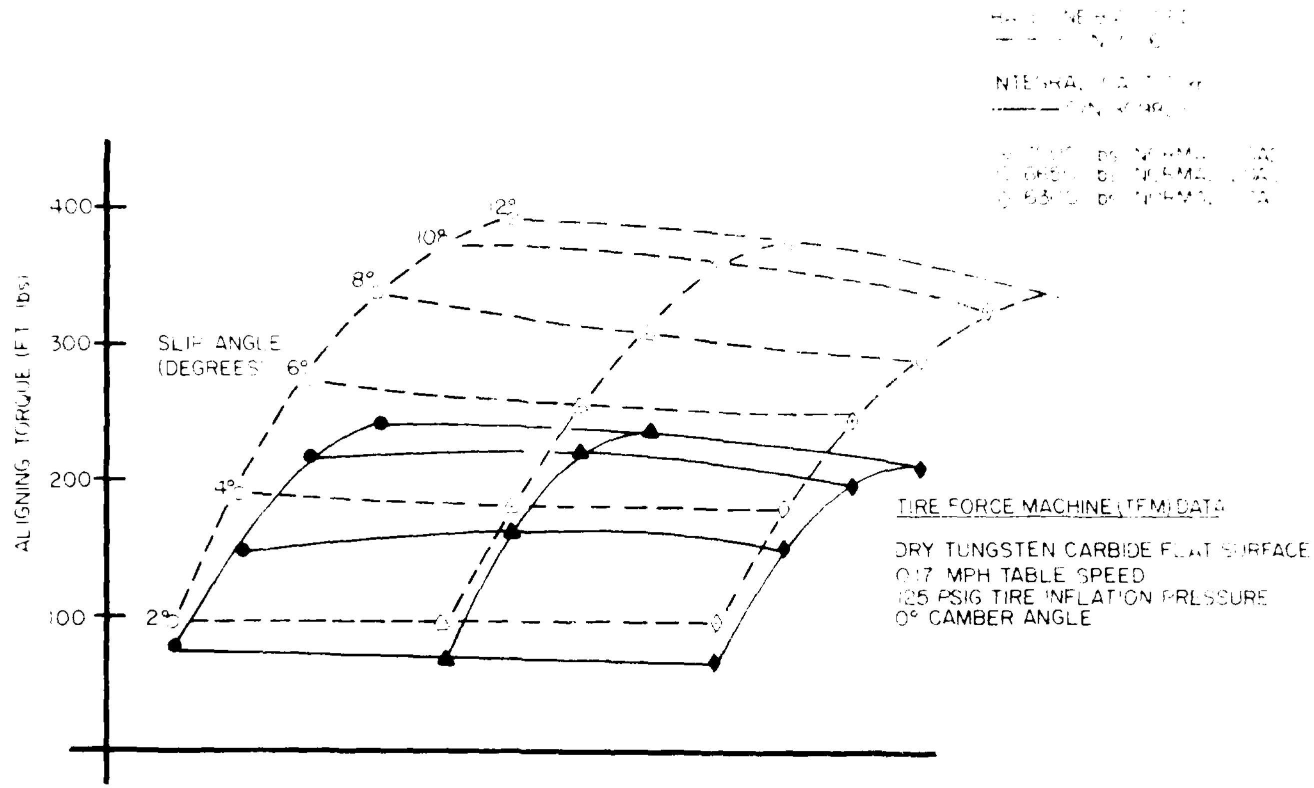


Figure [illegible] Aligning Torque [illegible] Slip Angle and Vertical Load Carpet Plots.

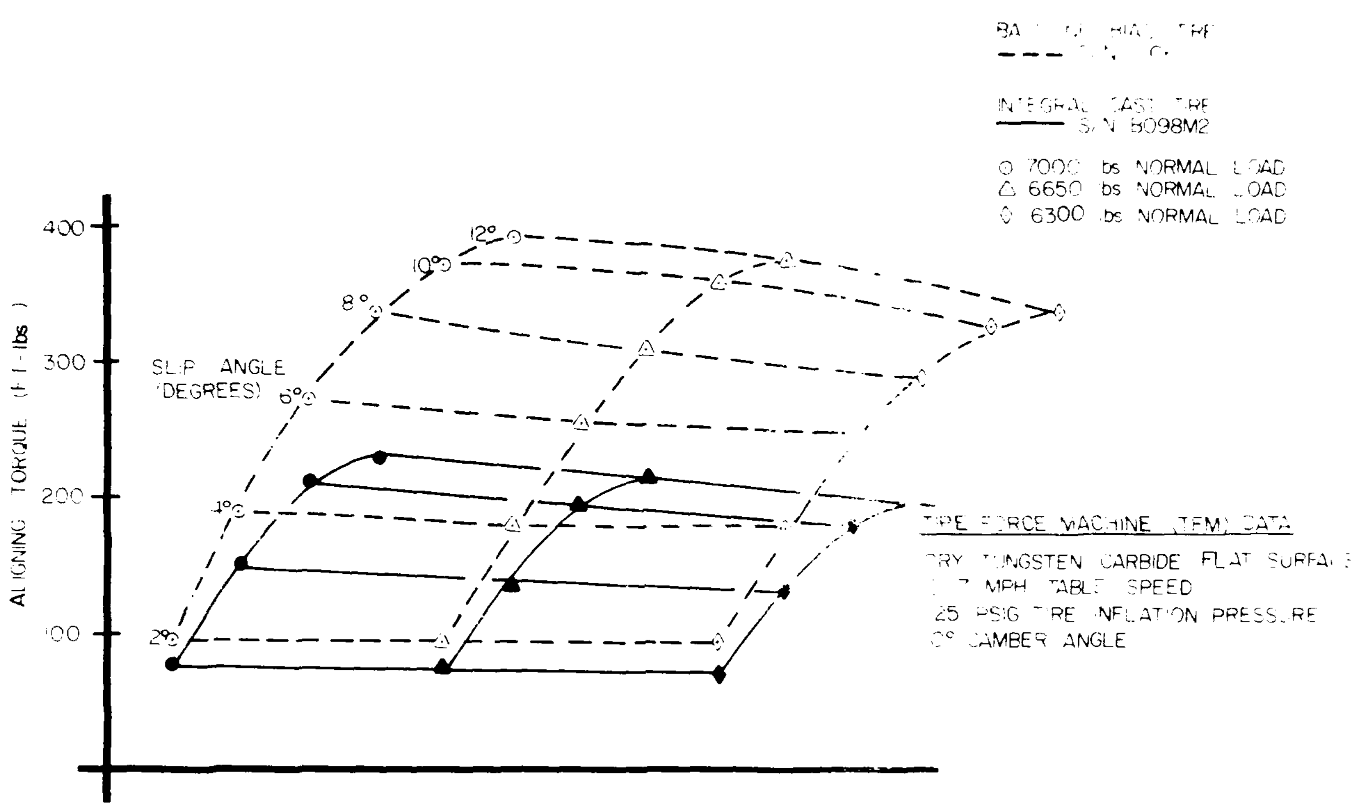


Figure 104. Aligning Torque vs Slip Angle and Vertical Load (Carpet Plots)

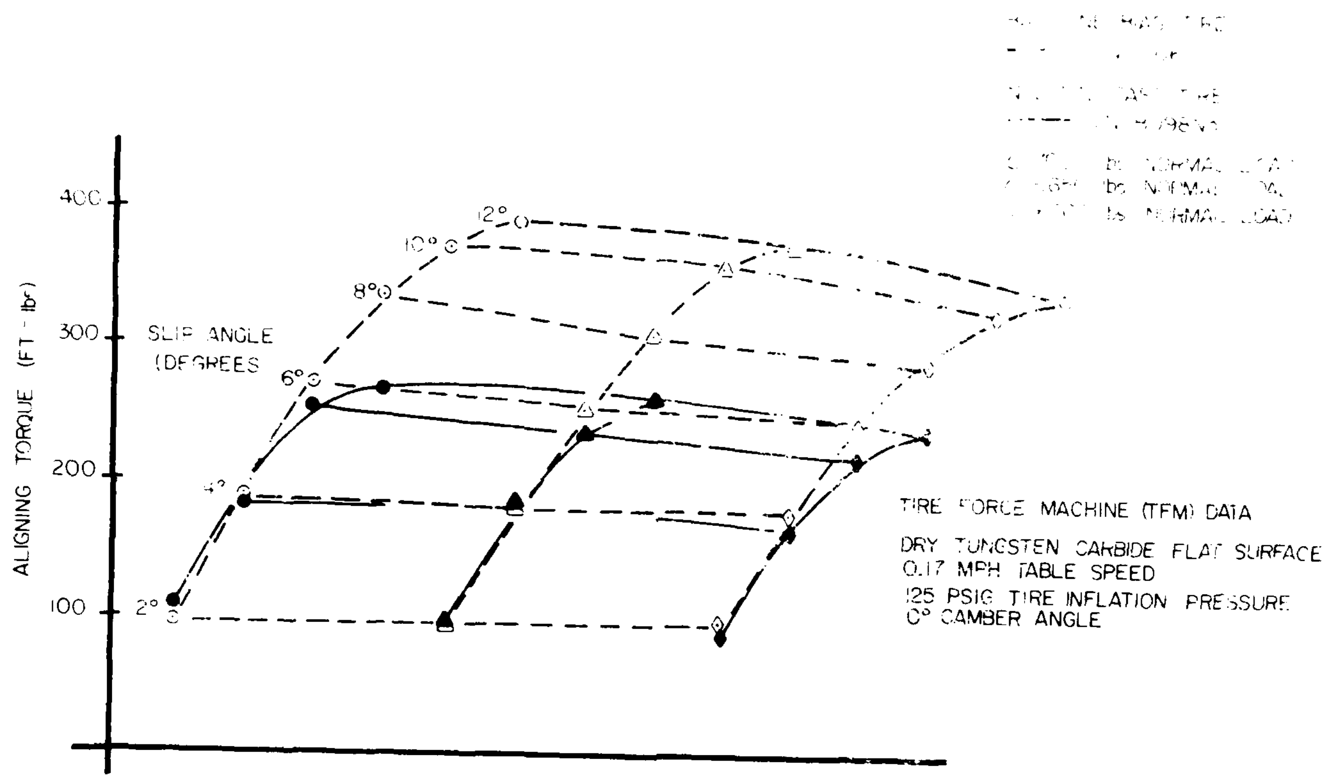


Figure 105. Aligning Torque Vs Slip Angle and Vertical Load (Carpet Plots)

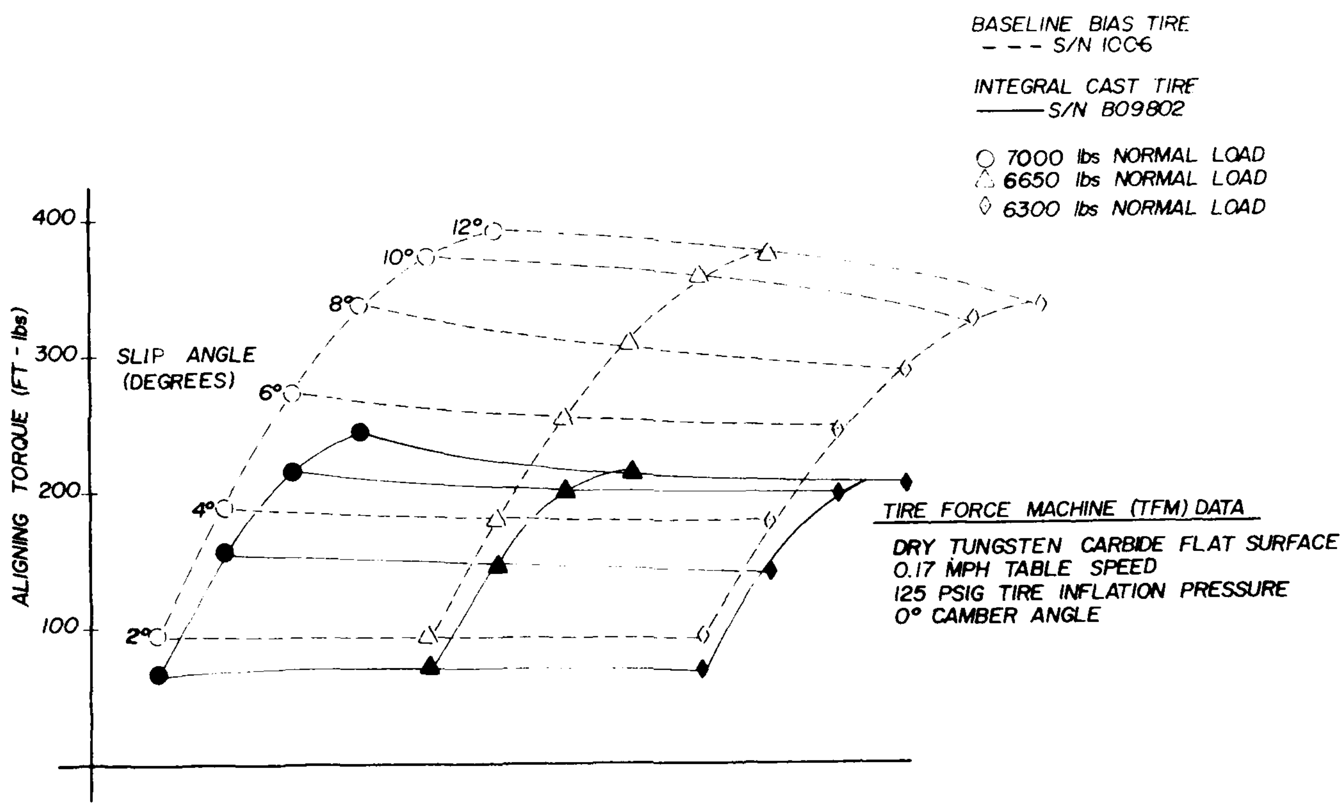


Figure 106. Aligning Torque Vs Slip Angle and Vertical Load (Carpet Plots)

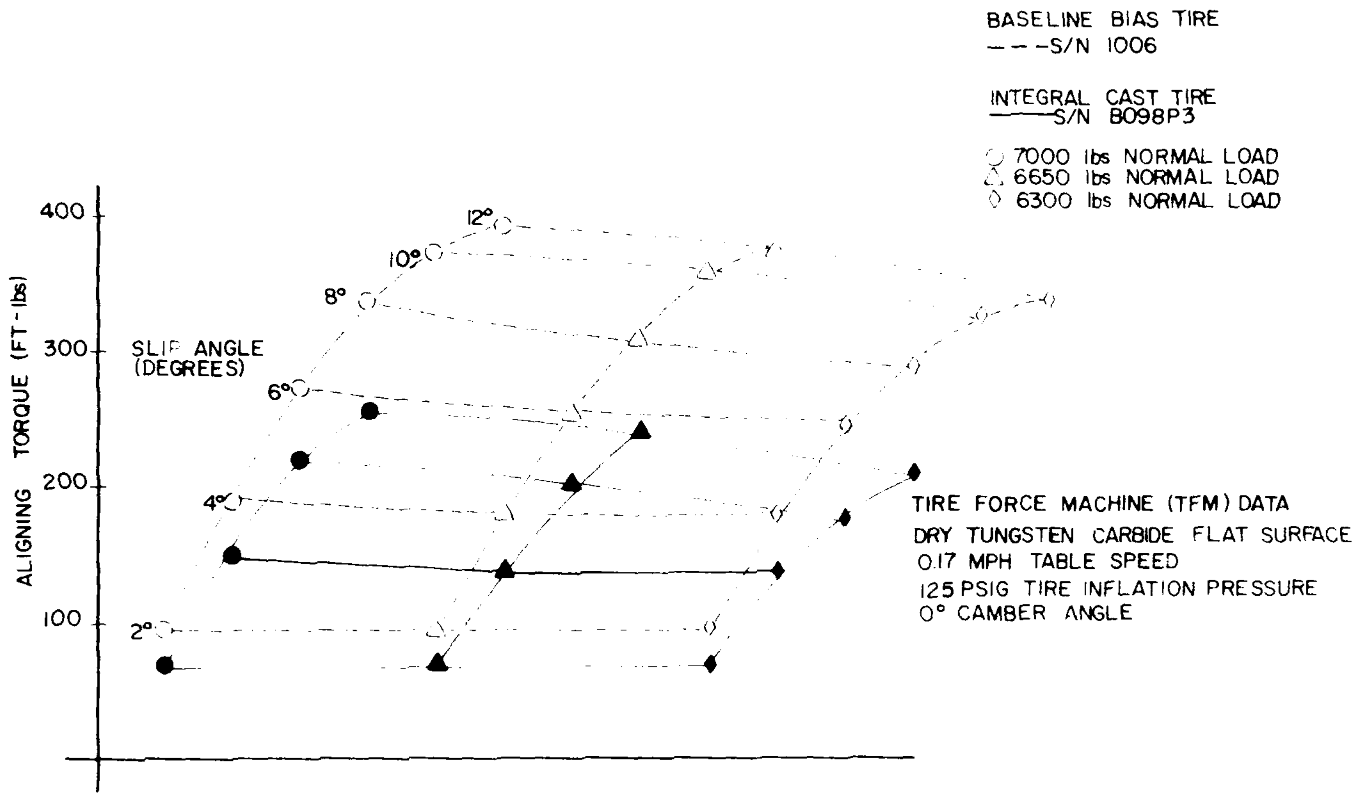


Figure 107. Aligning Torque Vs Slip Angle and Vertical Load (Carpet Plots)

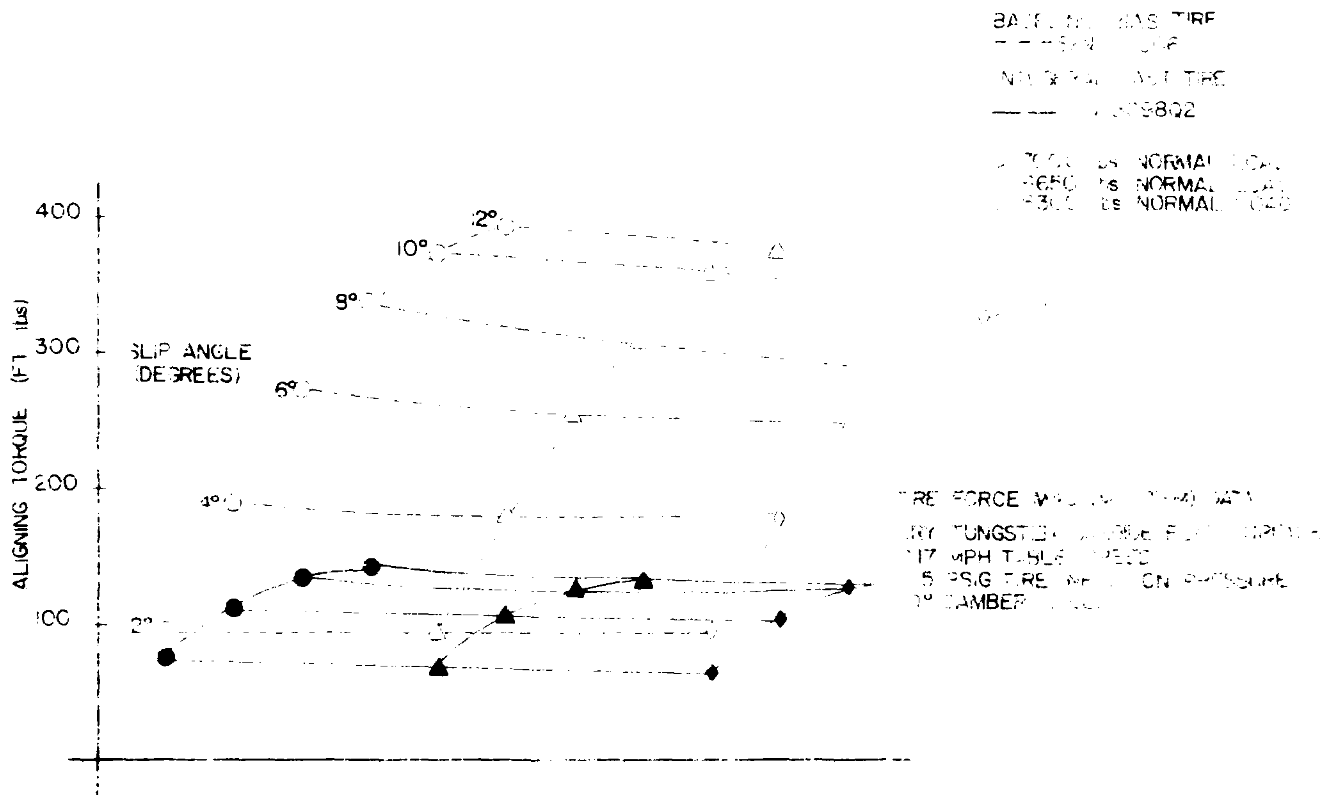


Figure 29. Aligning Torque vs Slip Angle and Normal Load

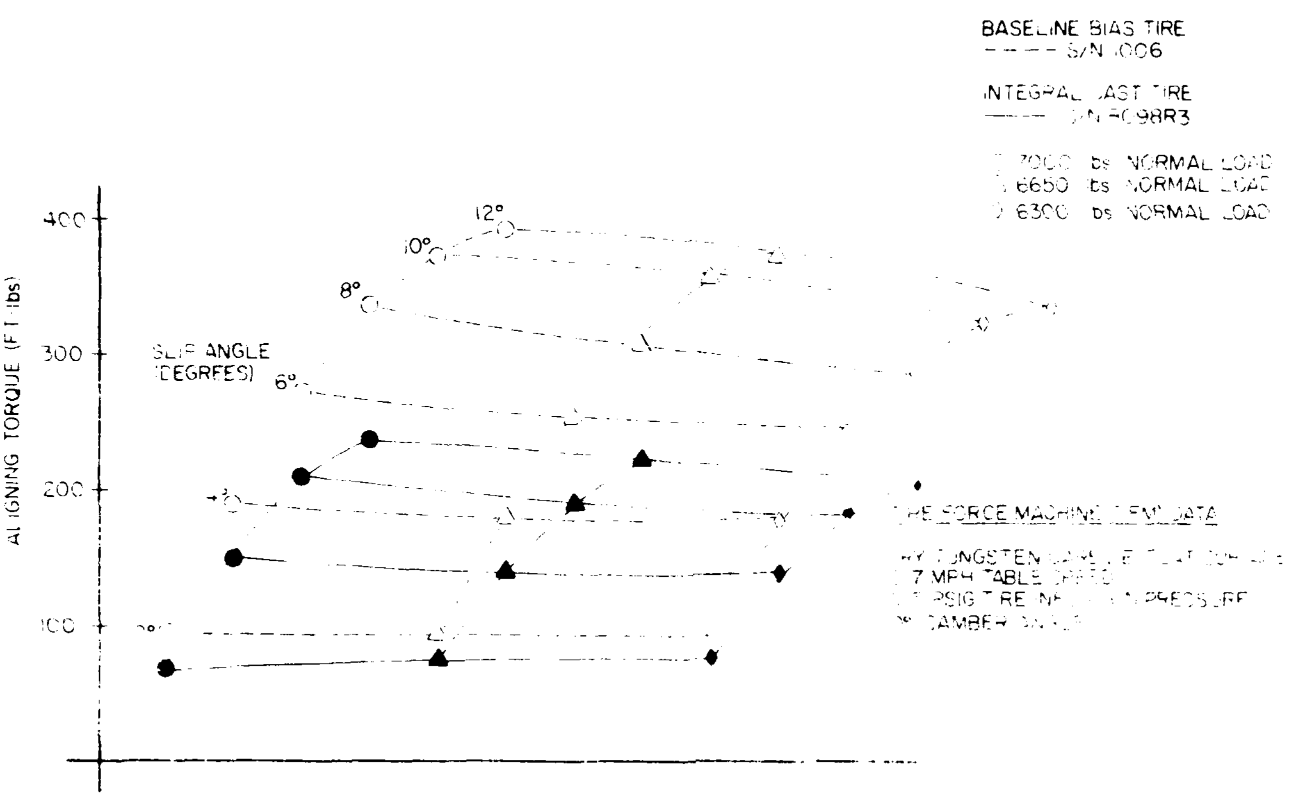


Figure 109 Aligning Torque vs Slip Angle and Vertical Load [illegible] Tests)

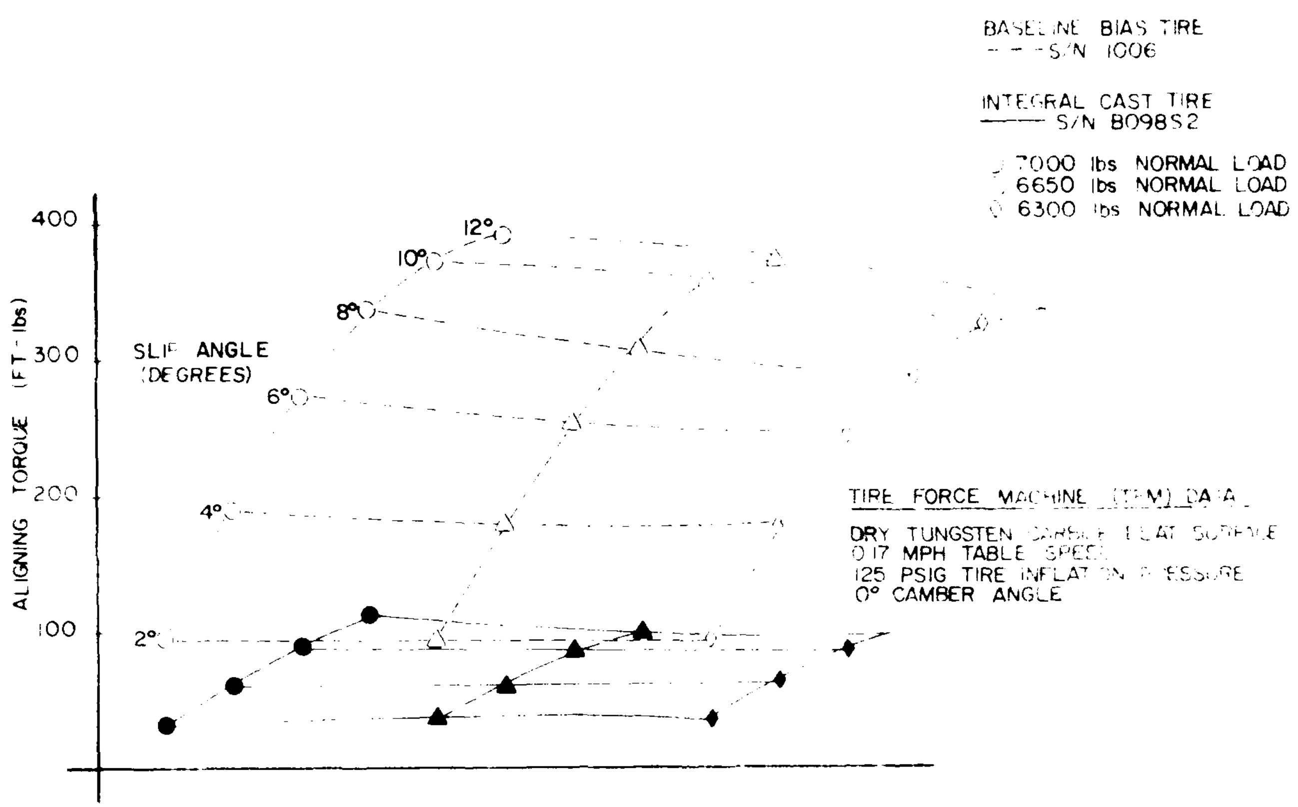


Figure 11. Aligning Torque V
(Carpet Plots)

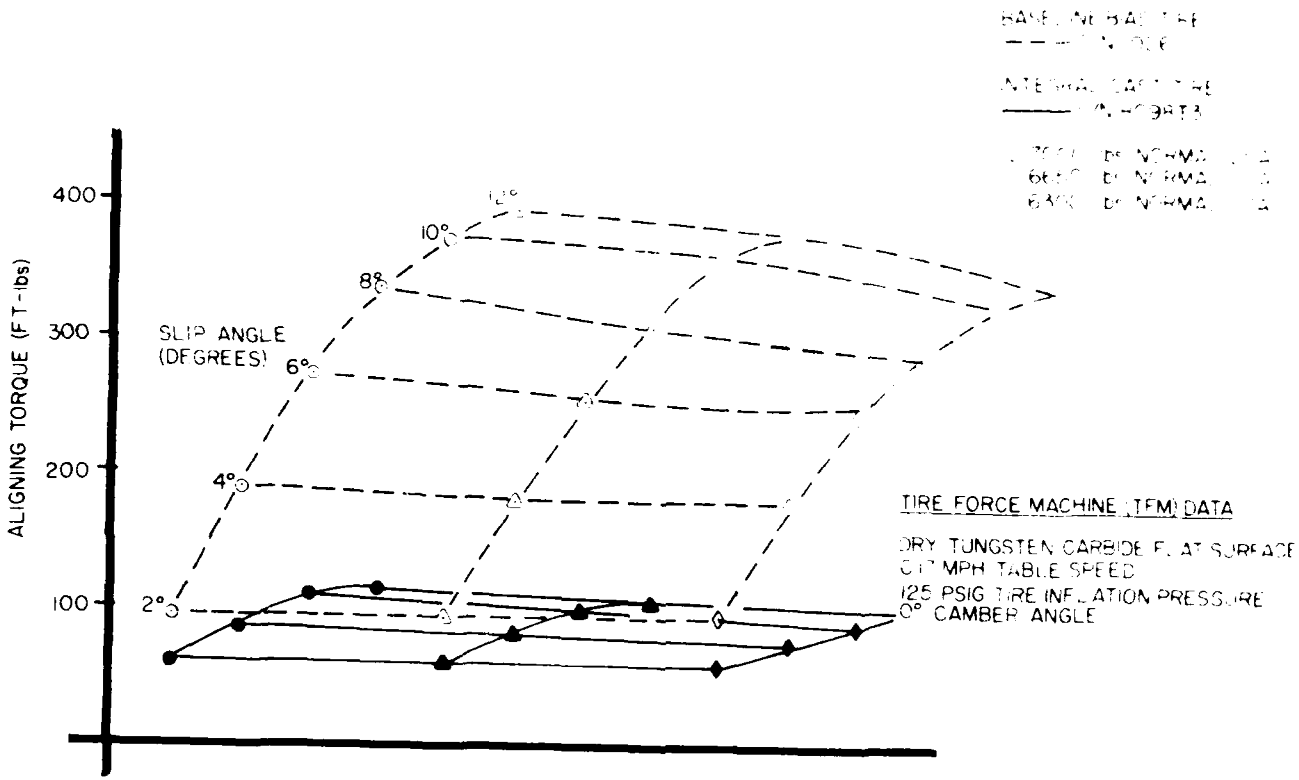


Figure 11_ Aligning Torque Vs Slip Angle and ...
(Carpet Plots)

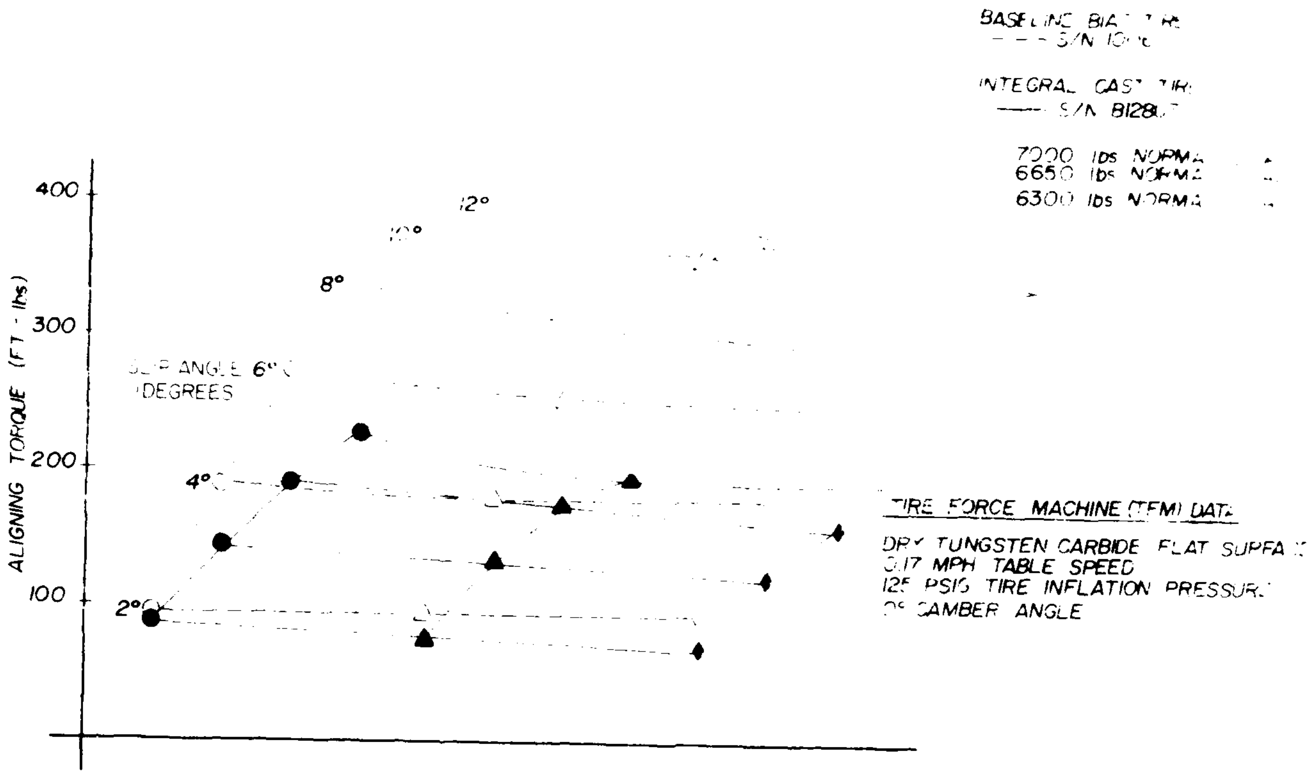


Figure ... Aligning Torque ... Slip Angle at ...
(Carpet Plot)

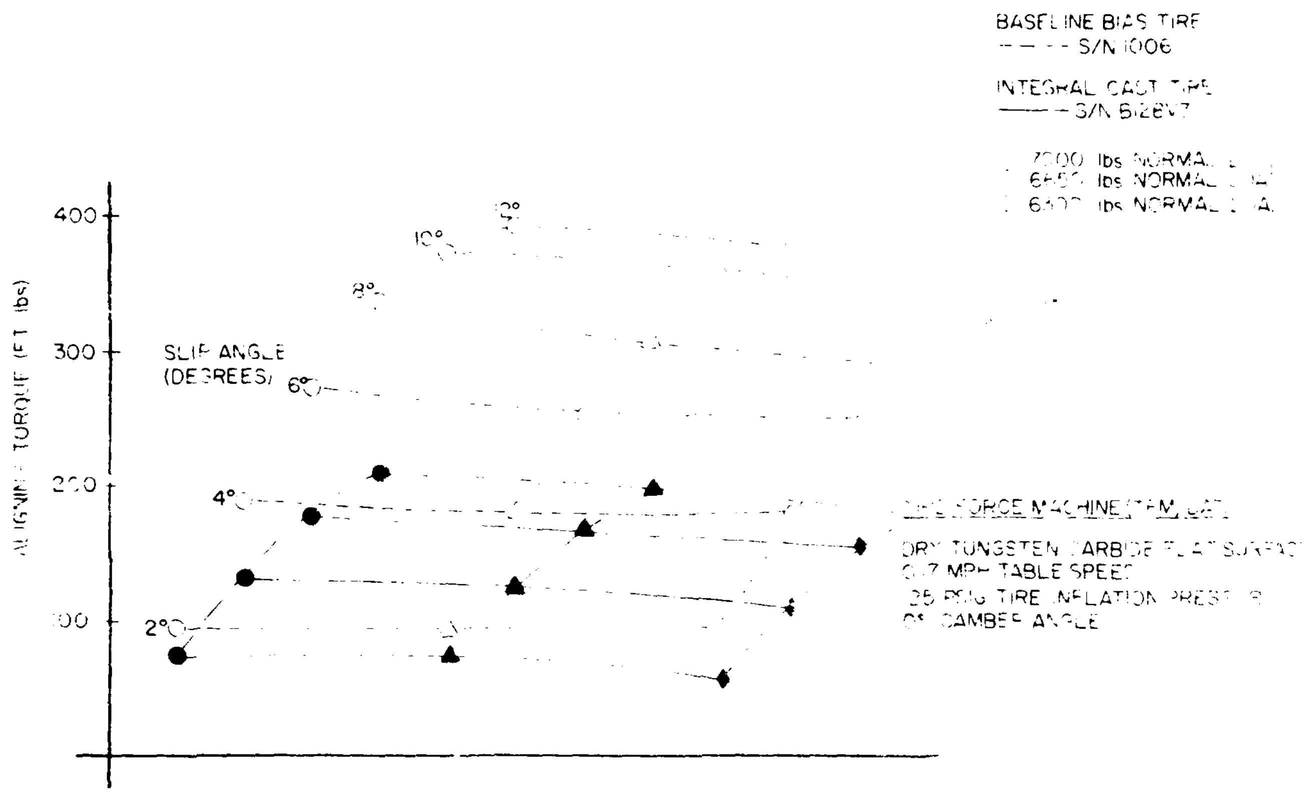


Figure 11. Aligning Torque vs Slip Angle and Vertical Load (Carpet Plots)

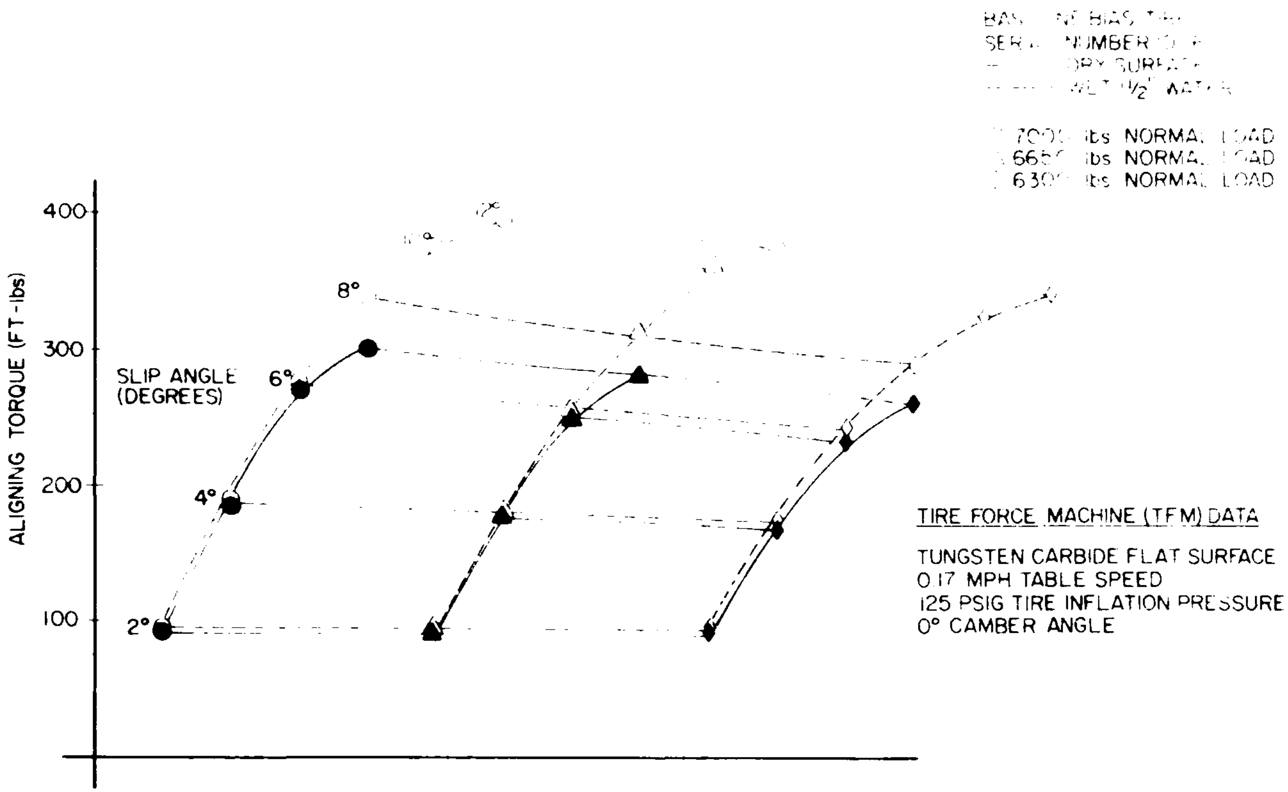


Figure 114. Aligning Torque Vs Slip Angle and Vertical Load (Carpet Plots)

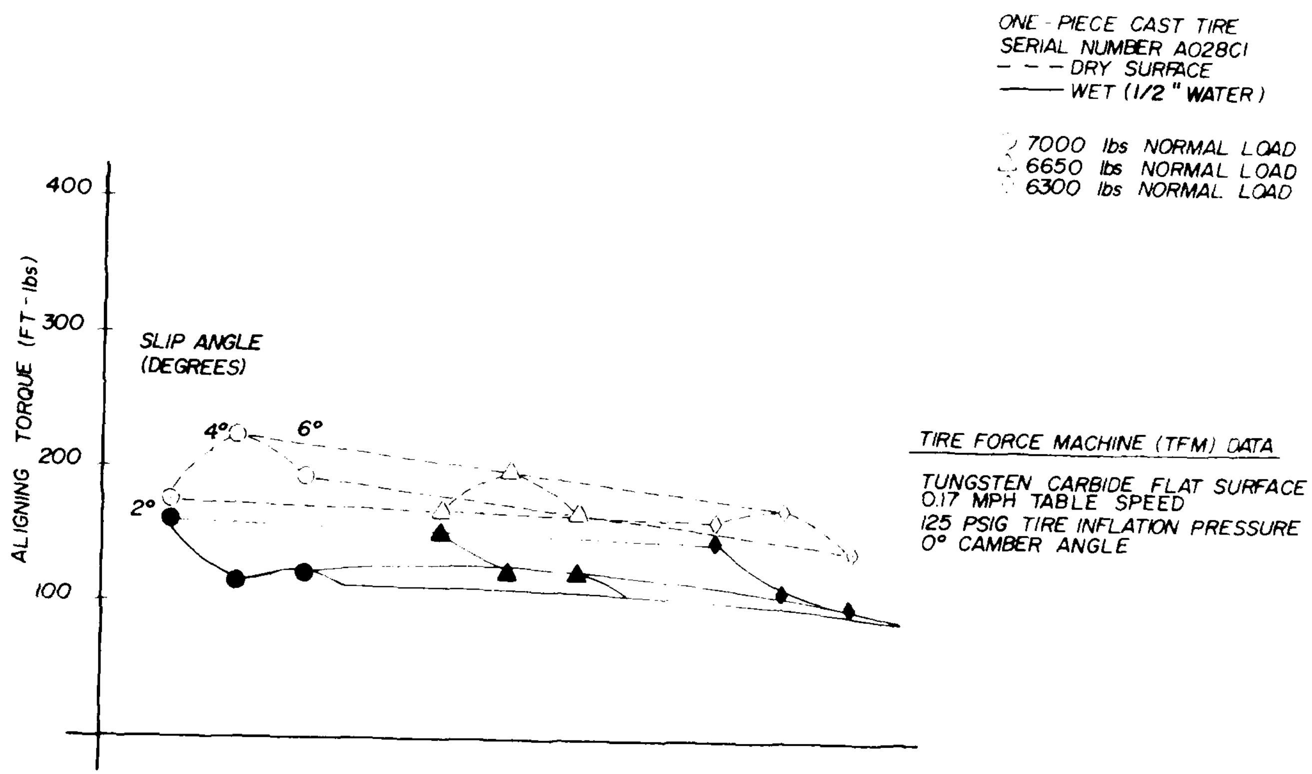


Figure 115. Aligning Torque Vs Slip Angle and Vertical Load (Carpet Plots)

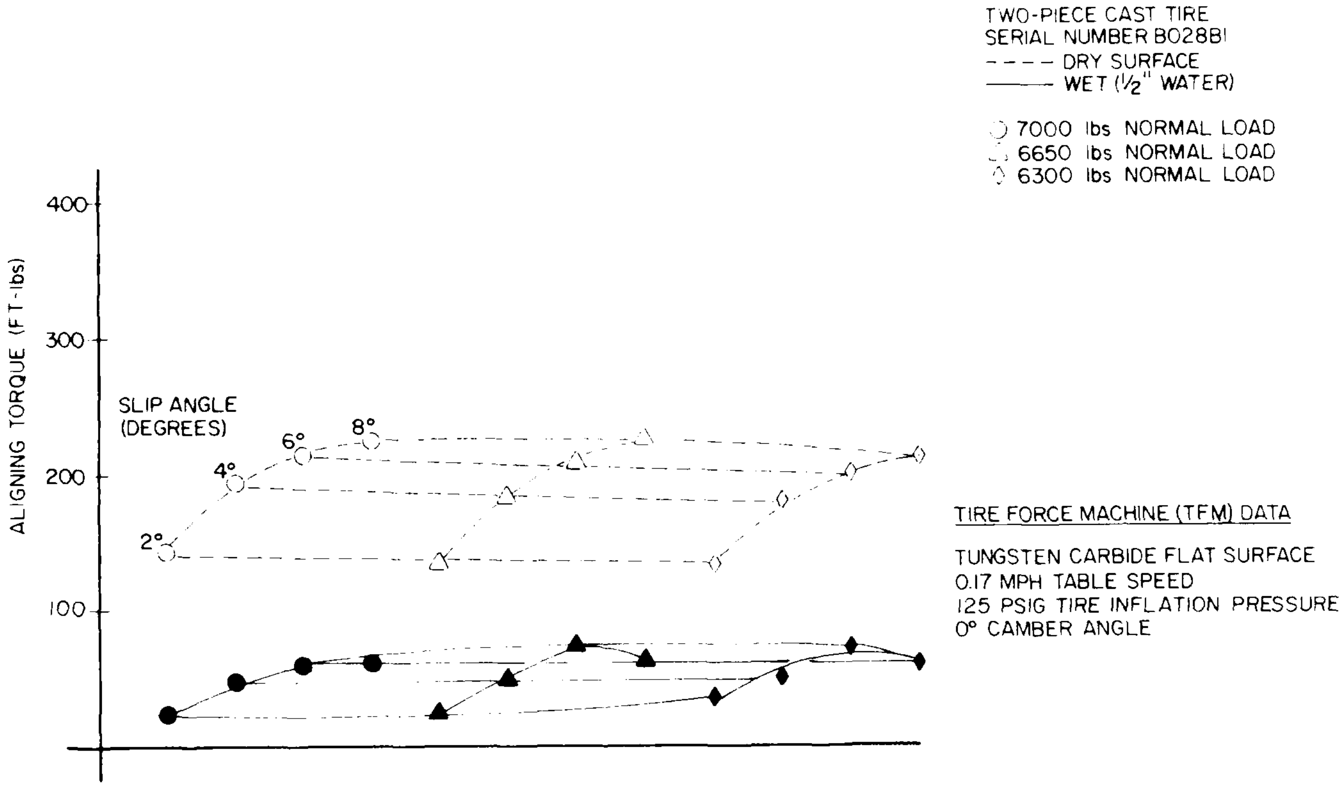


Figure 116. Aligning Torque Vs Slip Angle and Vertical Load (Carpet Plots)

Figure 117. Dynamic Taxi Test One-Piece Cast Tire (S/N [illegible]) Material Creep Failure-Tread Groove

Figure 115. Dynamic Taxi Test One Piece Cast Tire (S/N A077A4) Material Creep Failure-Tread Groove

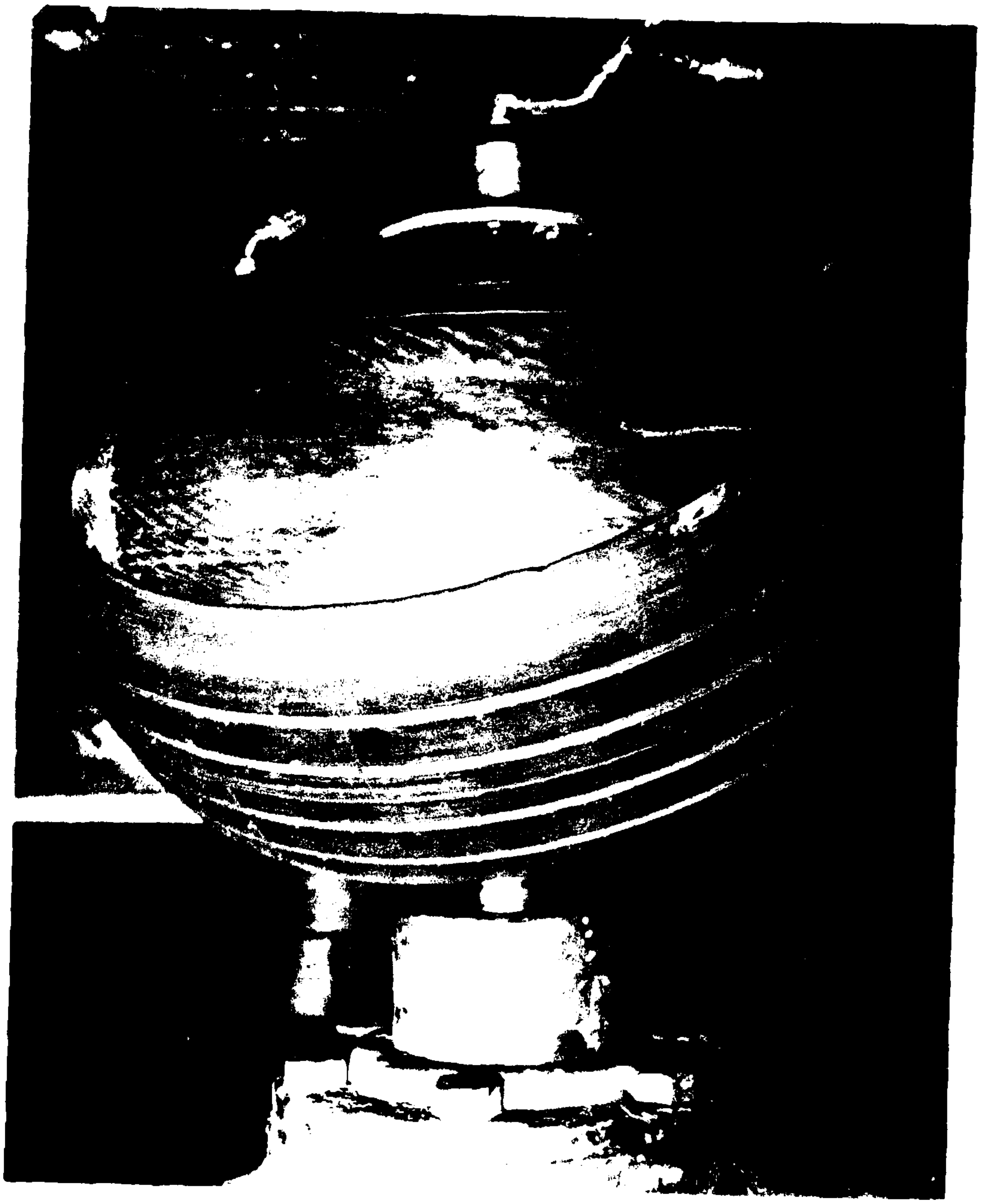


Figure 115. Dynamic Test [illegible] Two-Piece Cast Tire (S/N 609782)
Tread [illegible] Failure

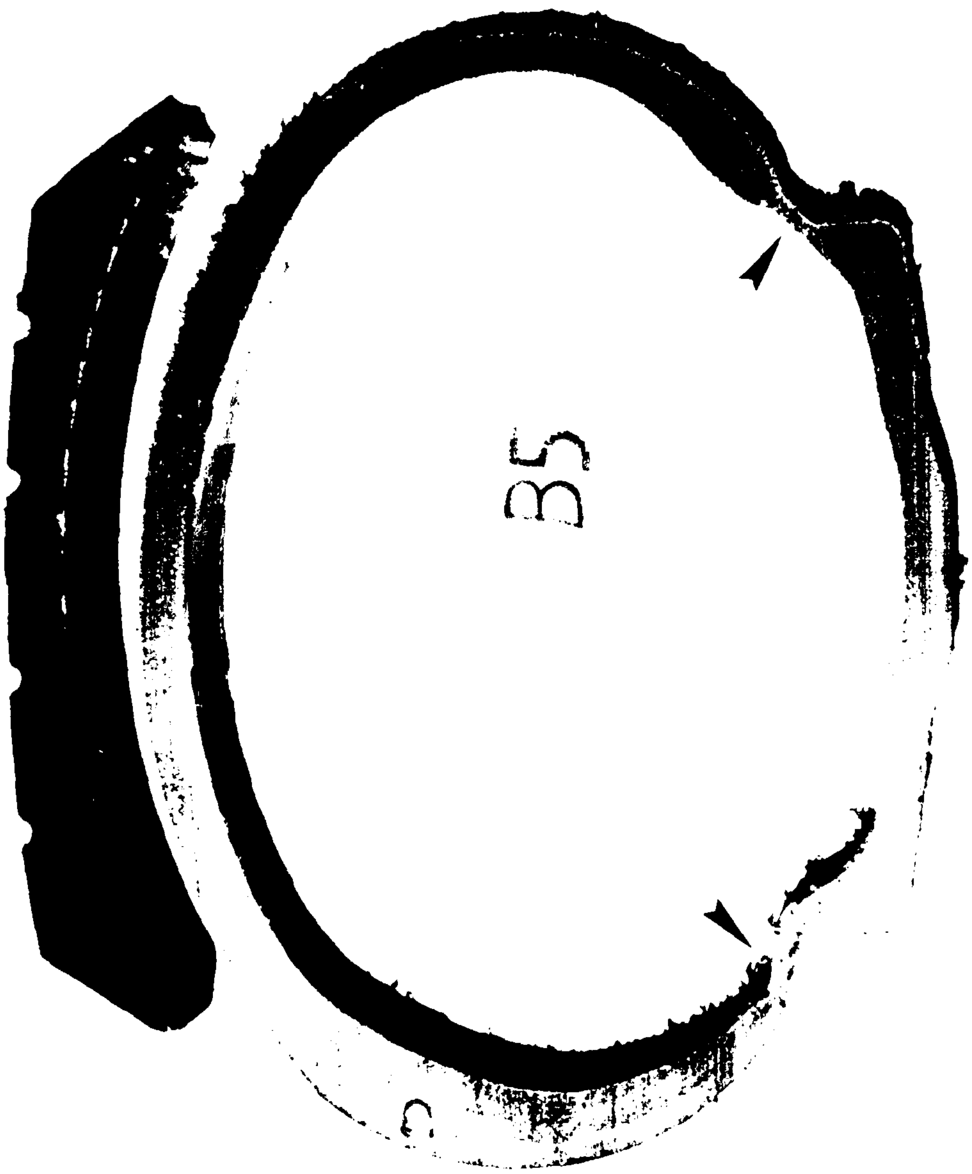


Figure 120. Dynamic Taxi Test Two-Piece Cast Tire (S/N B028B5) Material Creep Failure-Bead Radius Area

Figure 121. Dynamic Taxi Test Two-Piece Cast Tire (S/N B028B1)
Flex Crack Failure-Bead Radius Area

Figure 122. Two-Piece Cast Tire Section, Improper Material Thermal Cure

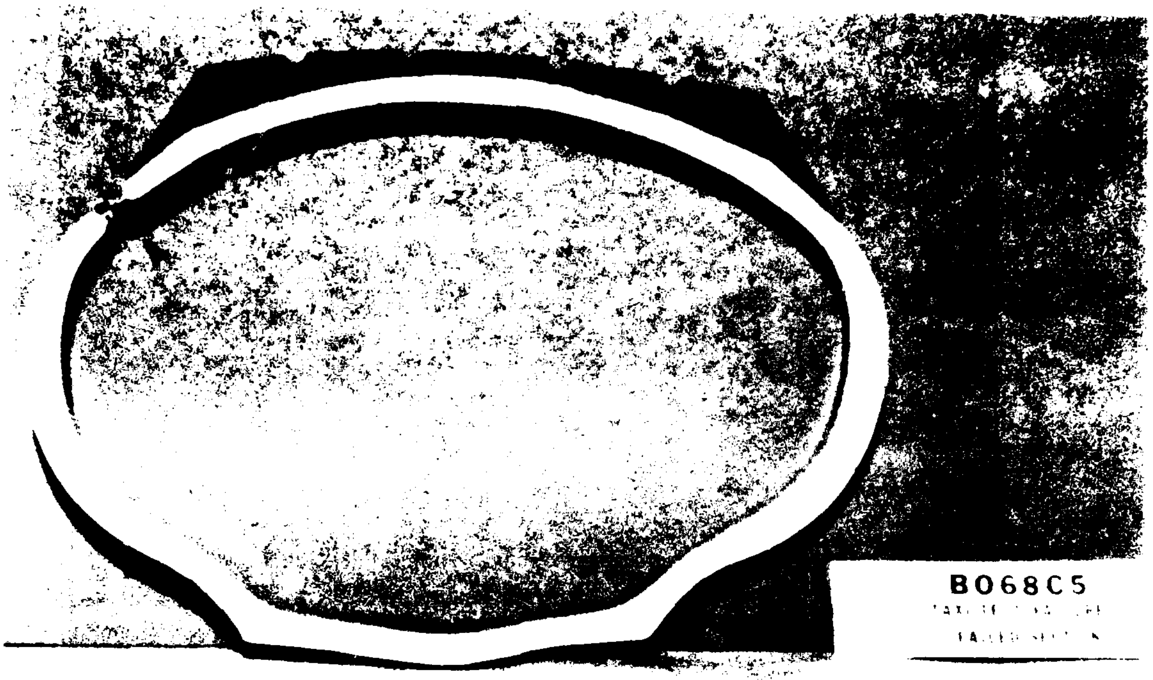


Figure 123. Dynamic Taxi Test Integral Cast Tire (S/N B068C5)
Material Creep Failure-Shoulder @ Belt Edge

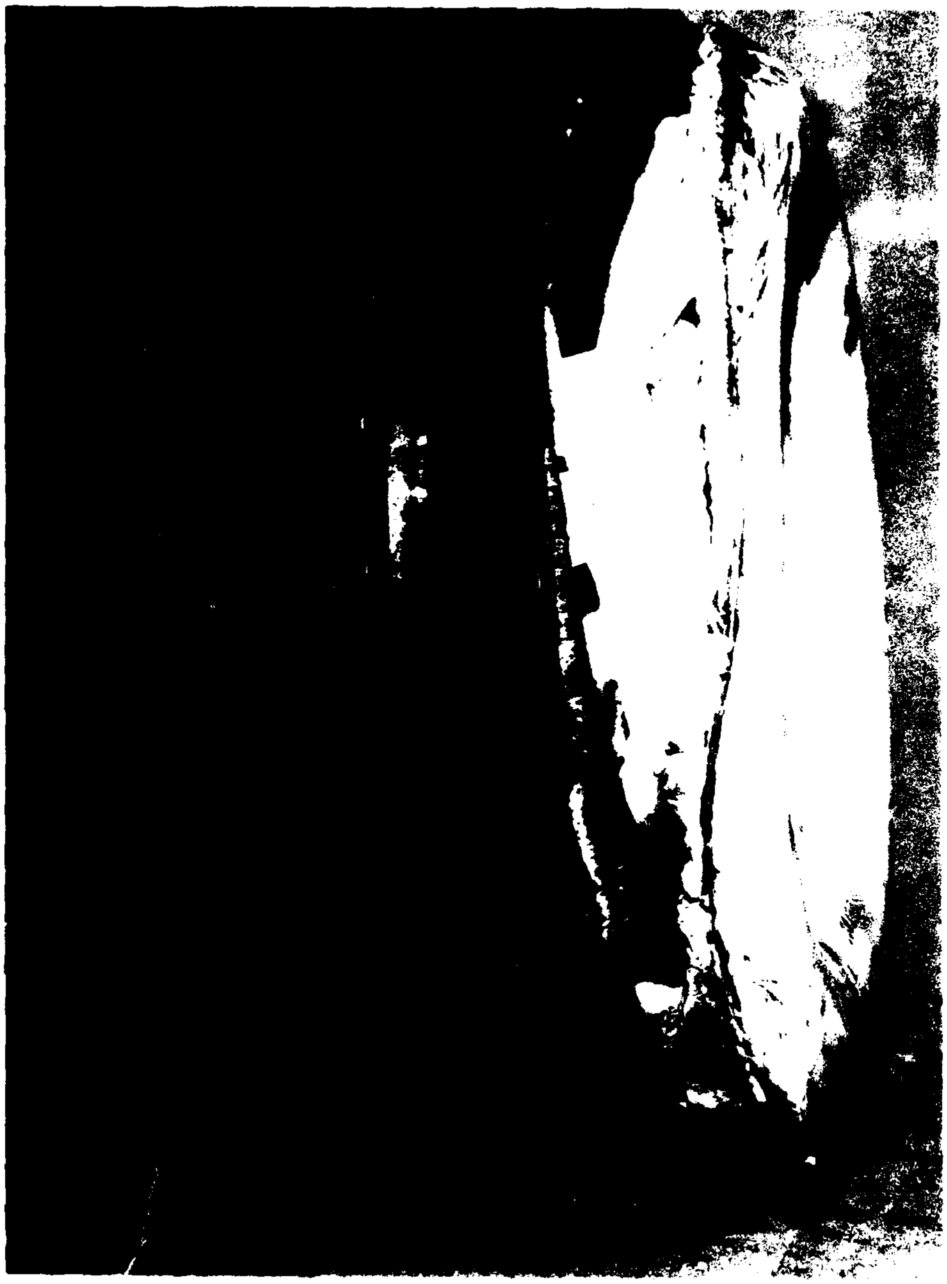


Figure 124. Dynamic Taxi Test Integral Cast Tire (S/N B078C2)
Material Creep Failure-Shoulder @ Belt Edge

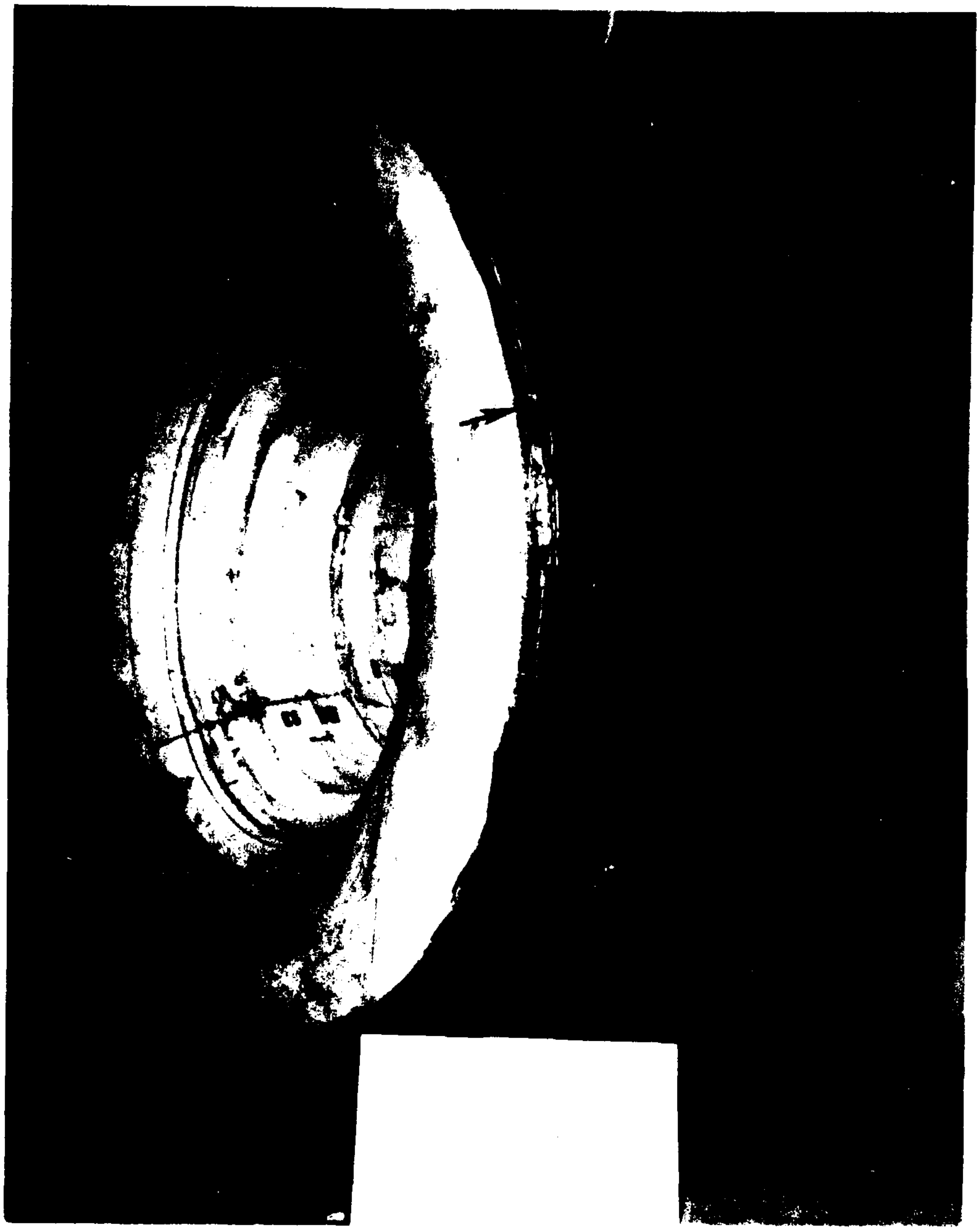


Figure 125. Dynamic Taxi Test Integral Cast Tire (S/N B088J3)
Material Creep Failure-Shoulder @ Belt Edge

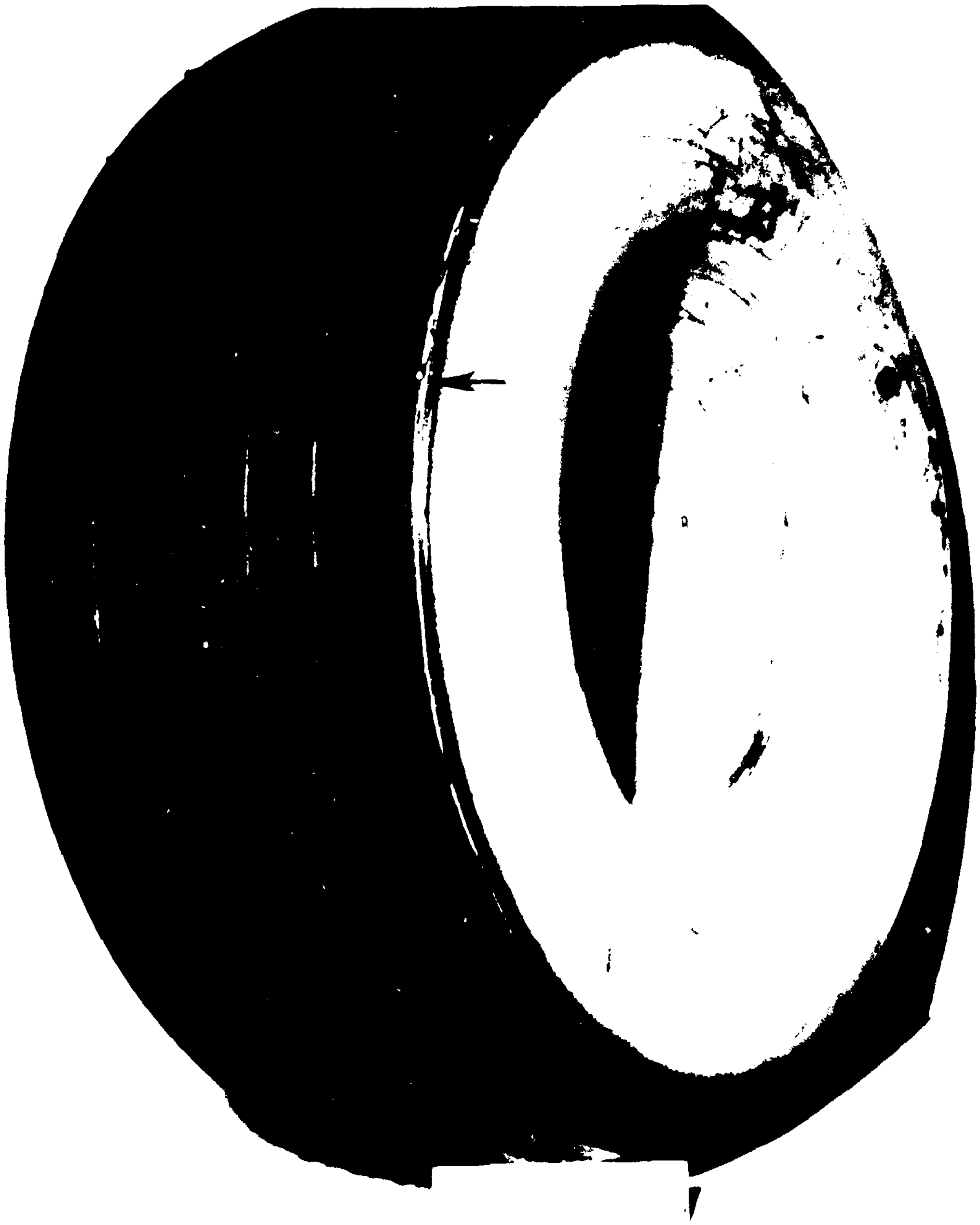


Figure 126. Dynamic Taxi Test Integral Cast Tire (S/N B088K1)
Material Creep Failure-Shoulder @ Belt Edge

Figure 127. Dynamic Taxi Test Integral Cast Tire (S/N B07RC1) Material Creep Failure-Bead Radius Area

Figure 128. Dynamic Taxi Test Integral Cast Tire (S/N B08811)
Material Creep Failure-Bead Radius Area

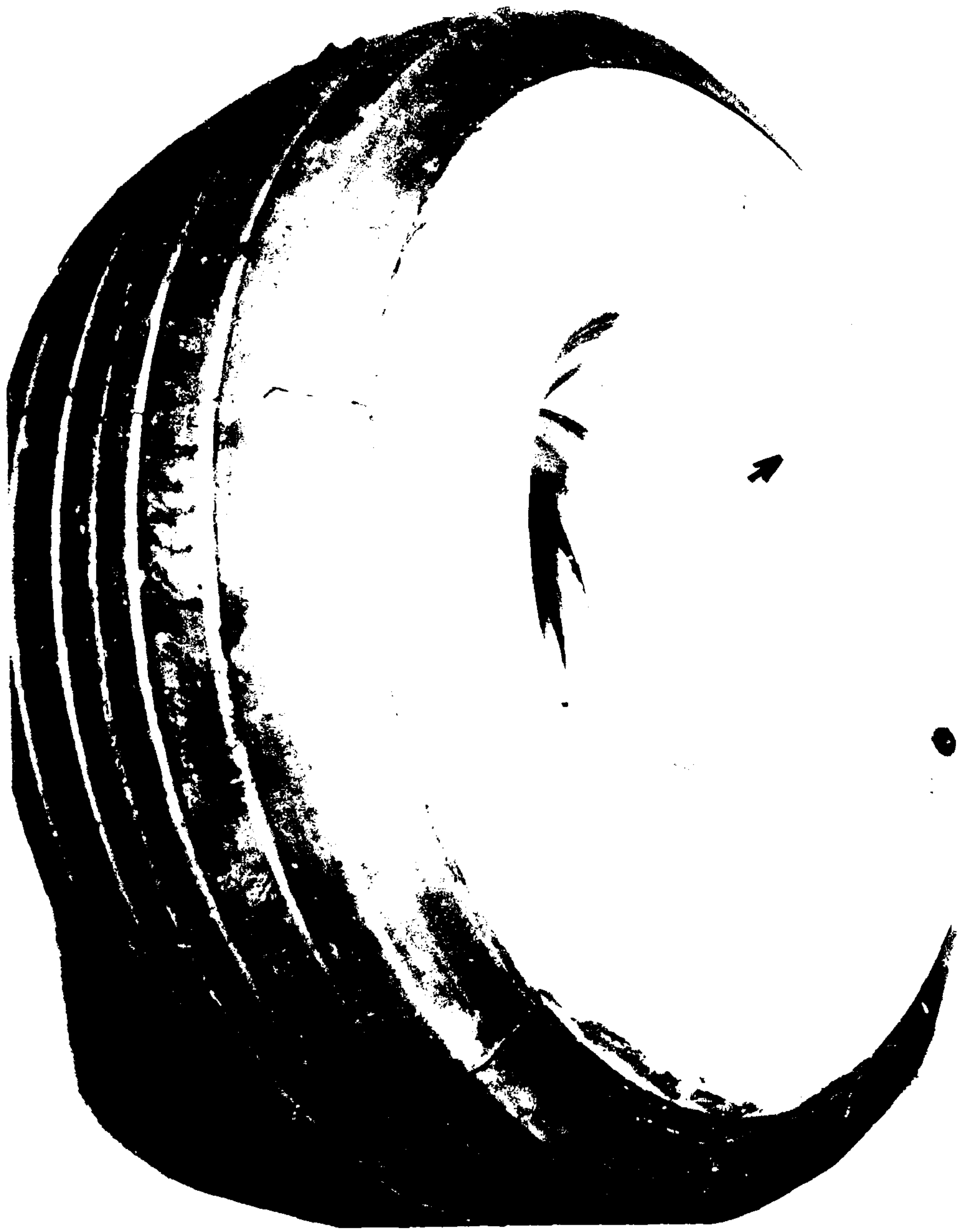


Figure 129. Dynamic Taxi Test Integral Cast Tire (S/N B098R1) Material Creep Failure-Bead Radius Area

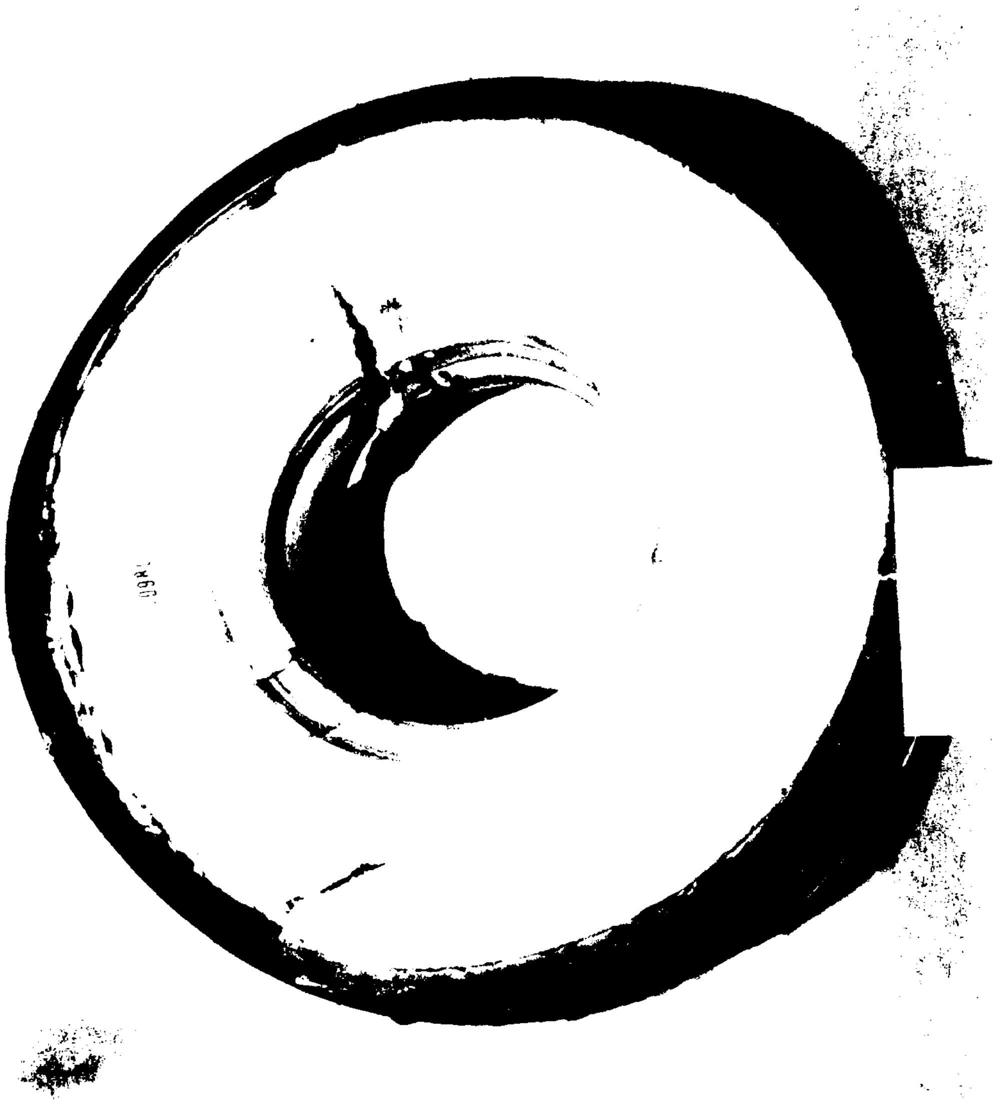


Figure 130. Dynamic Taxi Test Integral Cast Tire (S/N B098L1)
Brittle Failure-Sidewall (Glass Reinforced Tire)

Figure 131. Dynamic Test Integral Cast Tire [illegible]
Brittle Failure-Shoulder & Sidewall [illegible]
Reinforced Tire)

AD-A097 684 AIR FORCE WRIGHT AERONAUTICAL LABS WRIGHT-PATTERSON AFB OH F/G 1/3
STATIC AND DYNAMIC EVALUATION OF A-37 CAST AND CAST CARCASS/INT--ETC(U)
NOV 80 P C ULRICH
UNCLASSIFIED AFWAL-TR-80-3055 NL

3 OF 4
AD
A097684

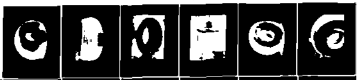


Figure 132. Dynamic Taxi Test Integral Cast Tire (S/N B098S1) Brittle Failure-Shoulder & Sidewall (Glass Reinforced Tire)

Figure 133. Dynamic Taxi Test Integral Cast Tire (S/N B128U1)
Brittle Failure-Shoulder & Belt Edge

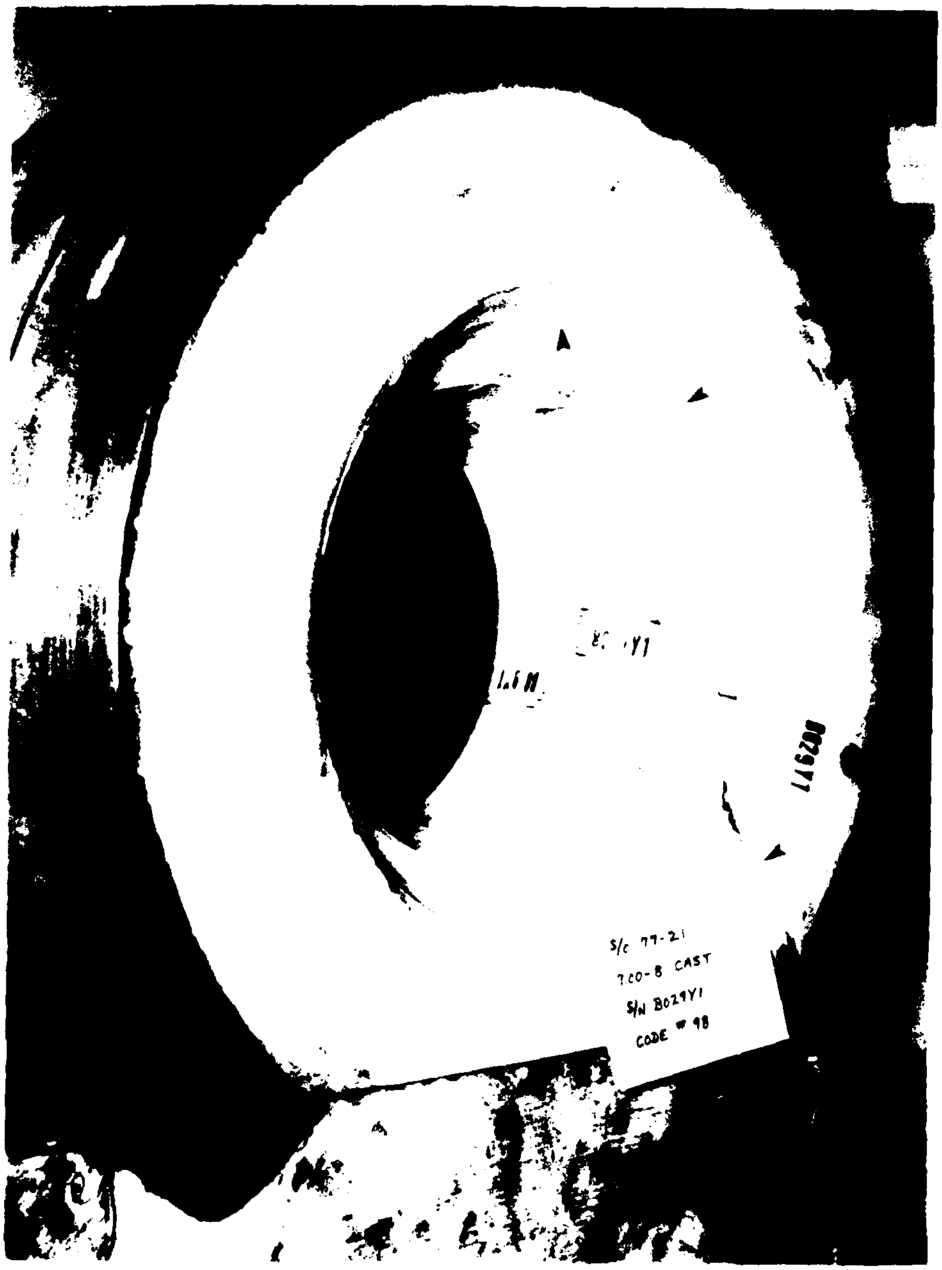


Figure 134. Dynamic Taxi Test Integral Cast Tire (S/N B029Y1) Brittle Failure-Sidewall & Bead Radius Area

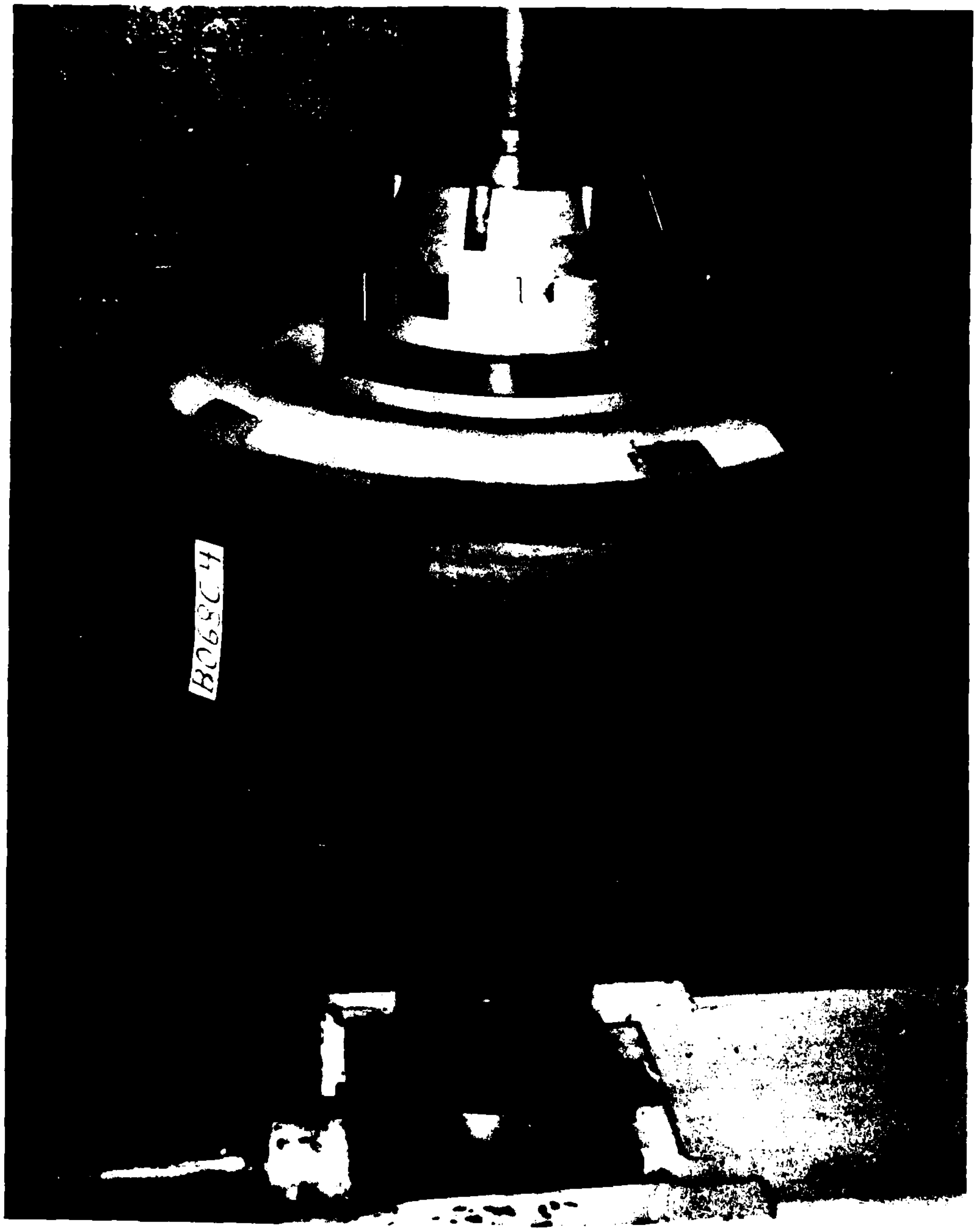


Figure 135. Dynamic Take Off Test Integral Cast Tire (S/N B068C4) Successfully Completed 20 (0-150 MPH) Take Offs

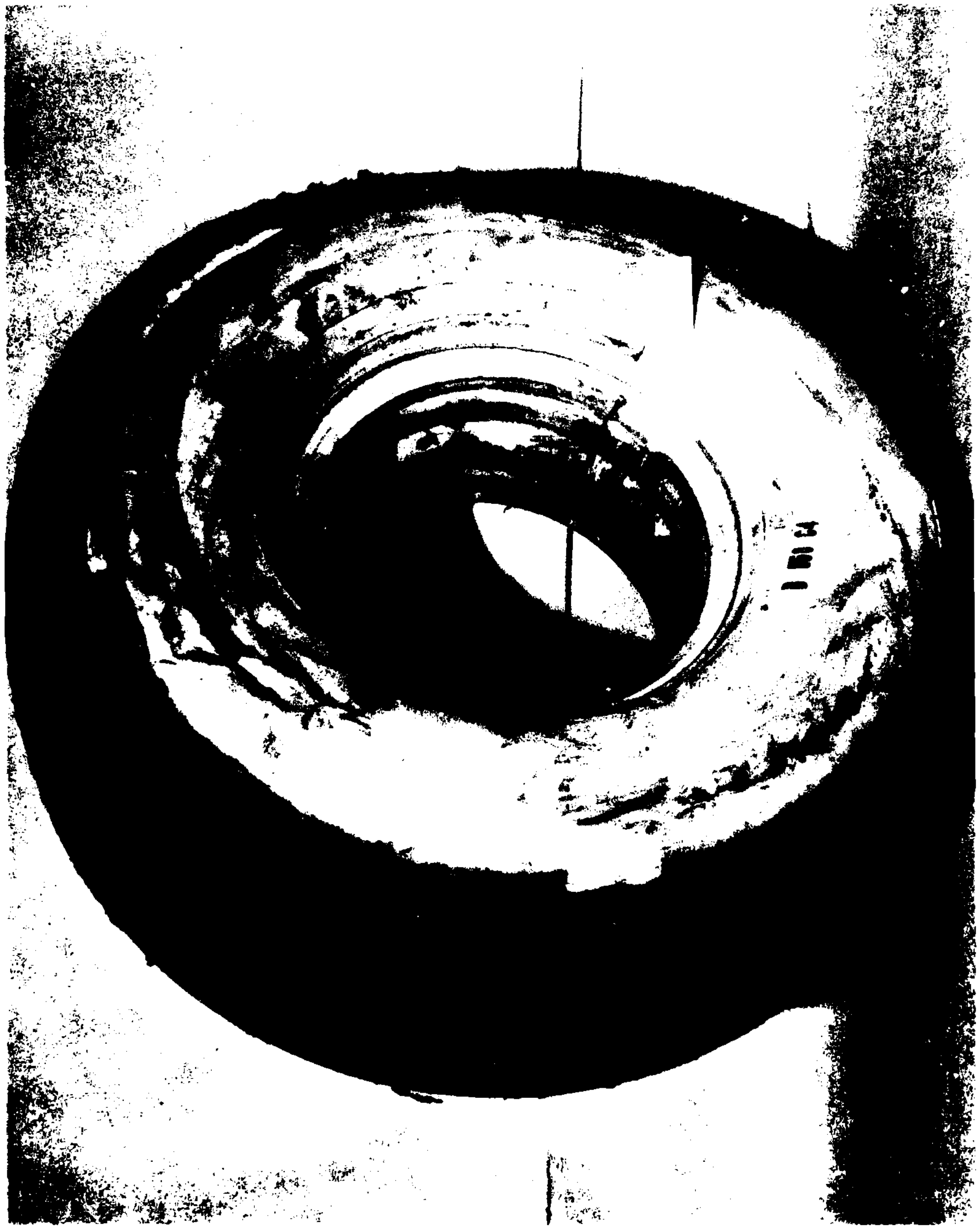


Figure 136. Dynamic Take Off Test Integral Cast Tire (S/N B068C4) Successfully Completed 100 (0-150 MPH) Take Offs. Failed During First Taxi Test-Creep Failure @ Belt Edge

Figure 137. Dynamic Taxi Test Integral Cast Tire (S/N B068C5) Tire to Wheel Slippage (3.5 Inches)

APPENDIX C

TIRE CONTACT PRINTS (FOOTPRINTS)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8/16 .... MFR Goodyear
NEW X .... USED .... RETREAD BY N/A ....
S. O. NO. .... CODE NO. ....2-N.... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..9.34.. IN.
RATED INFLATION ...125........... PSI MAX. FOOTPRINT WDTH. ..6.14... IN.
100 % RATED LOAD ..6650....... LBS. NET CONTACT AREA ..44.26.. SQ. IN.
32.41 DEFLECTION GROSS CONTACT AREA ..49.48.. SQ. IN.
OPERATOR .... DATE 3/6/78 SERIAL NR. 0920..................

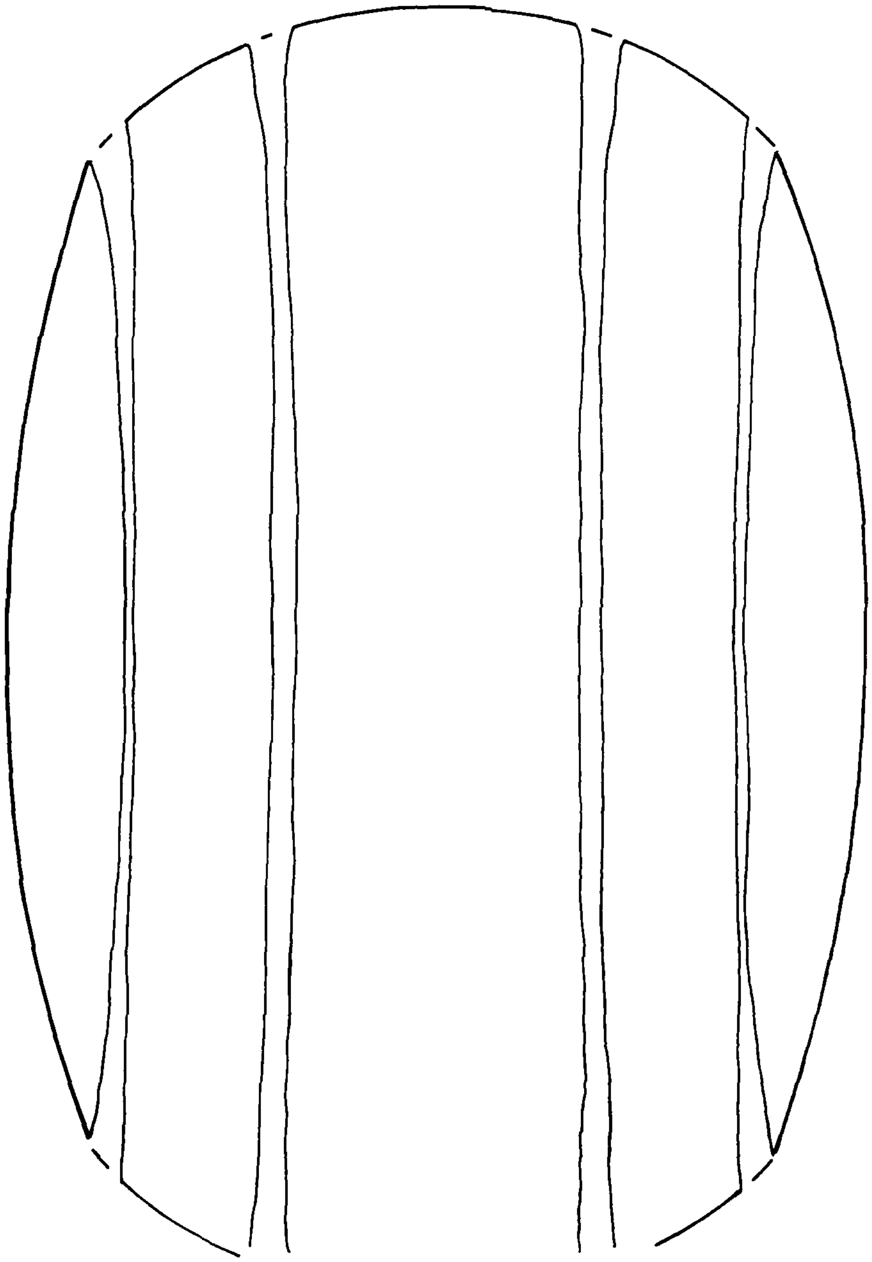


Figure C-1. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8/16 MFR Goodyear
NEW X USED .... RETREAD BY N/A
S. O. NO. 77-21 CODE NO. 2-N FLPL X FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 7.61 IN.
RATED INFLATION 125 PSI MAX. FOOTPRINT WDTH. 5.37 IN.
60 % RATED LOAD 3990 LBS. NET CONTACT AREA 29.85 SQ. IN.
21.24 DEFLECTION GROSS CONTACT AREA 34.55 SQ. IN.
OPERATOR .... DATE 3/6/78 SERIAL NR. 0920

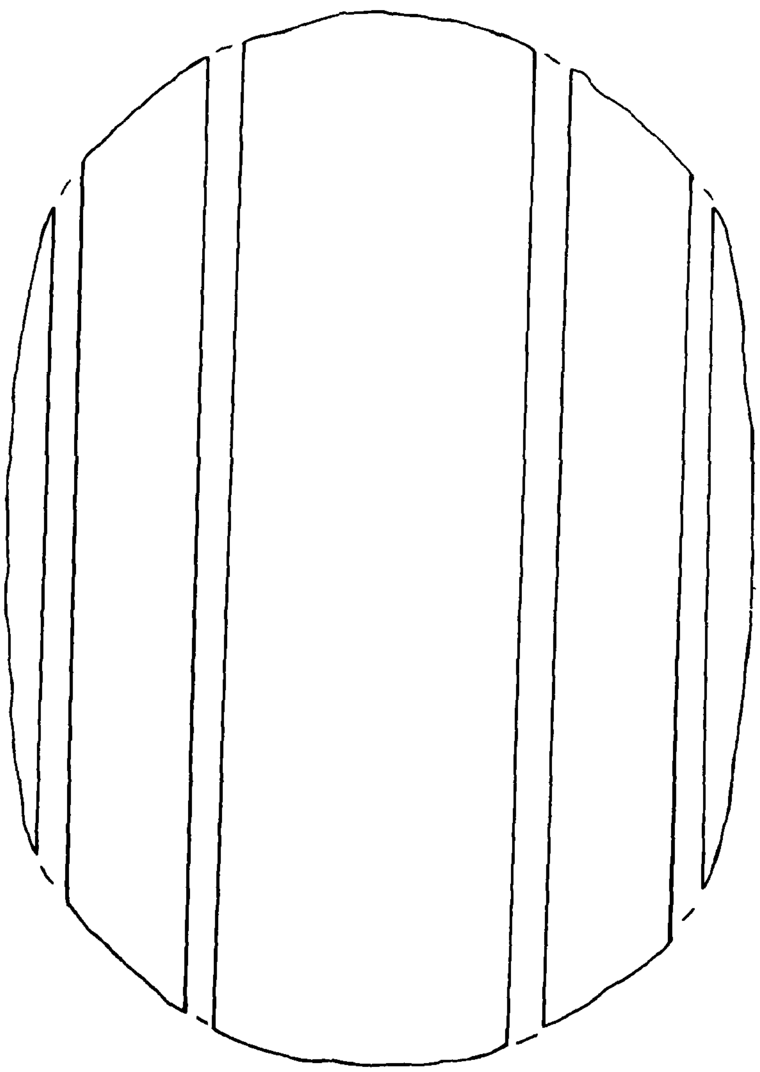


Figure C-2. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ......7.00-8.......... MFR Zedron..
NEW .X... USED .... RETREAD BY ....N/A.........................
S. O. NO. .....77-21....... CODE NO. ...1....... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..7.17.. IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. ..5.23.. IN.
.100. % RATED LOAD ....6650..... LBS. NET CONTACT AREA ..22.90. SQ. IN.
26.80. DEFLECTION GROSS CONTACT AREA .28.93 SQ. IN.
OPERATOR .... DATE 3/1/78 SERIAL NR. .A077A1...........

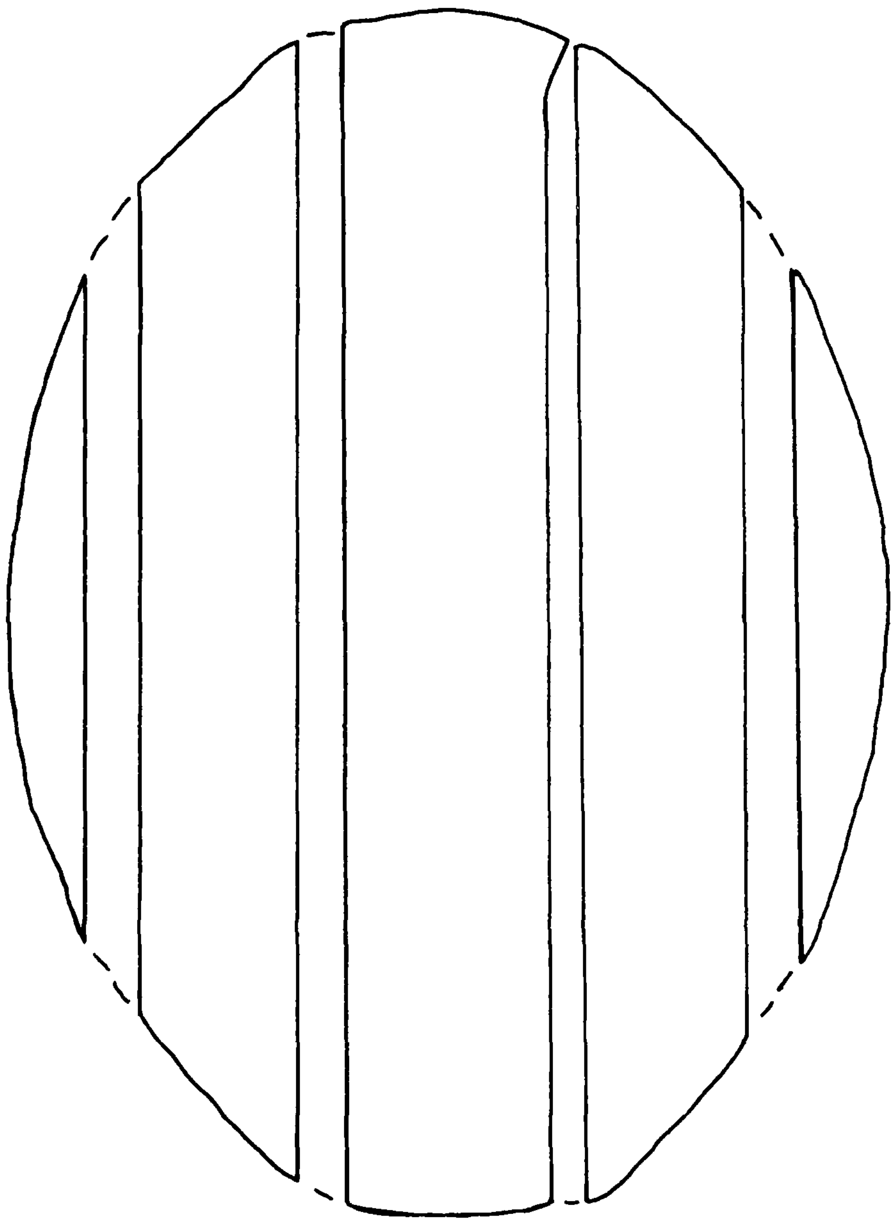


Figure C-3. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 700-8 .... MFR Zedron
NEW ..X... USED .... RETREAD BY .....N/A
S. O. NO. ....77-21..... CODE NO. ....1...... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ...5.62.. IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. ...3.63.. IN.
.60. % RATED LOAD ....3990..... LBS. NET CONTACT AREA ...14.45 SQ. IN.
.18.24. DEFLECTION GROSS CONTACT AREA .16.93 SQ. IN.
OPERATOR .... DATE 3/1/78 SERIAL NR. .A077A..........

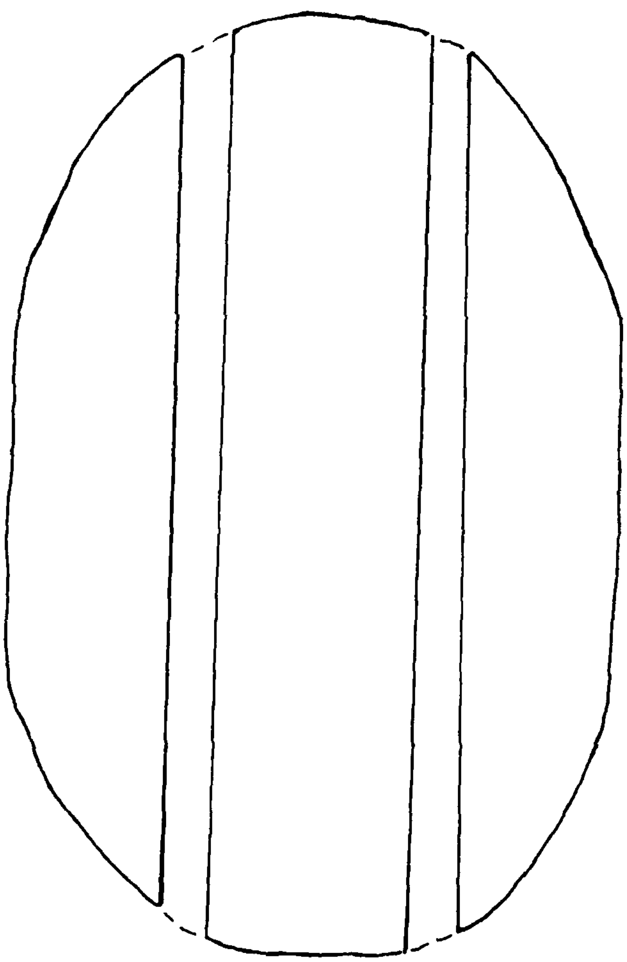


Figure C-4. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT [illegible] TIRE SIZE ..20 [illegible] .... MFR [illegible]..
[illegible] ..[illegible] ..... [illegible] BY ..[illegible] ....
[illegible] NO. ....77-21....... CURE NO. ....11..... FIRE ..X.. [illegible] .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .[illegible]... IN.
RATED INFLATION ......125..... PSI MAX. FOOTPRINT WDTH. .[illegible]... IN.
..[illegible] RATED LOAD ...[illegible]... LBS. NET CONTACT AREA ..[illegible]. SQ. IN.
..[illegible] DEFLECTION GROSS CONTACT AREA [illegible]. SQ. IN.
OPERATOR .... DATE [illegible]78 SERIAL NR. ..A097BBI.........

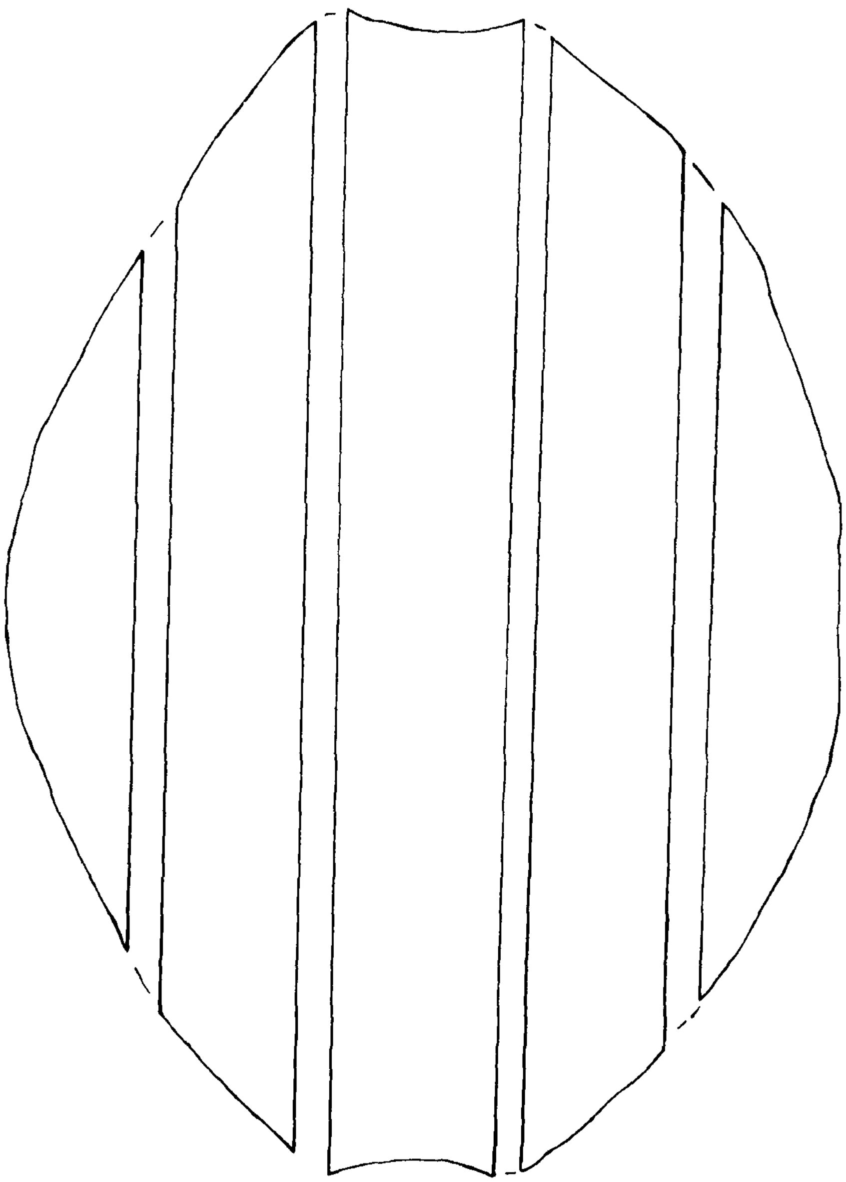


Figure C-5. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ..700-8.................... MFR Zedron..
NEW ..X... USED .... RETREAD BY .....N/A.........................
S. O. NO. ...77-21......... CODE NO. ..11....... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 6.77...... IN.
RATED INFLATION ..125.......... PSI MAX. FOOTPRINT WDTH. ..4.35... IN.
60...% RATED LOAD .....3990..... LBS. NET CONTACT AREA ..17.47.. SQ. IN.
22.34. DEFLECTION GROSS CONTACT AREA 23.17.. SQ. IN.
OPERATOR .... DATE 2.24/78 SERIAL NR. ..A097BB1.........

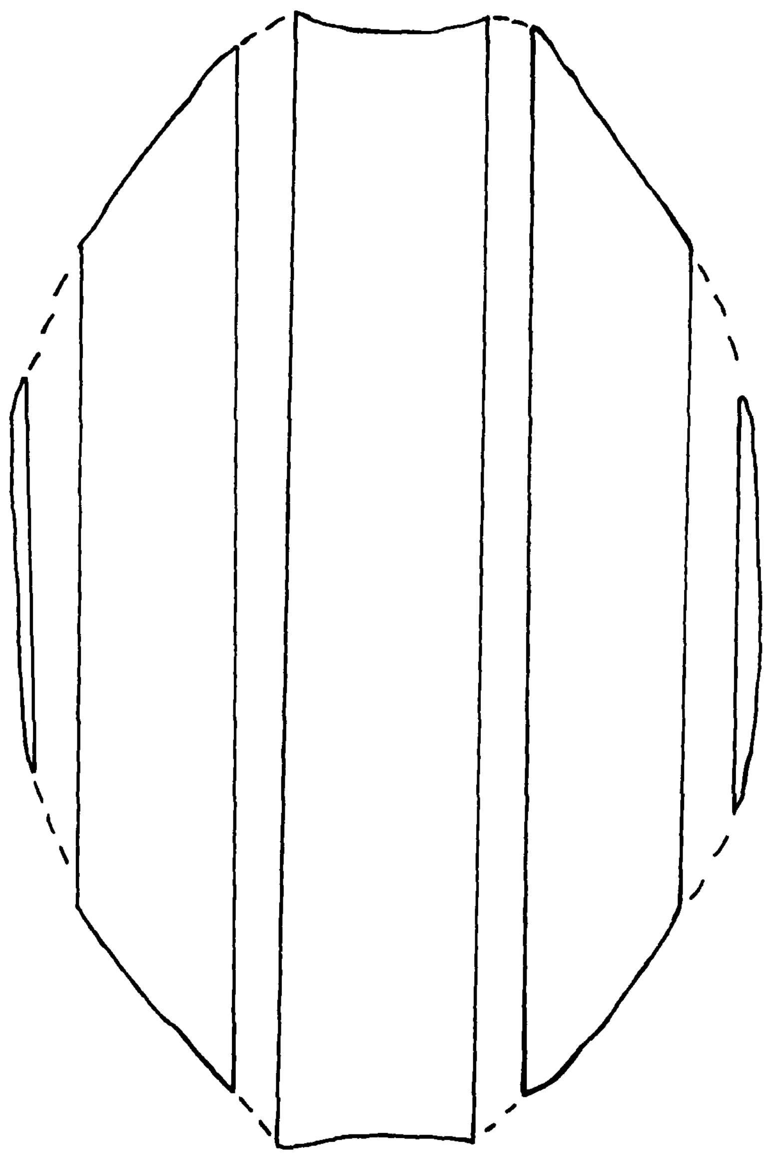


Figure C-6. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ..700-8.............. MFR Zedron..
NEW ...X.. USED .... RETREAD BY ..N/A...........................
S. O. NO. ..77-21.......... CODE NO. .....19.... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..8.02.. IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. ..5.72.. IN.
.100 % RATED LOAD .6650........ LBS. NET CONTACT AREA .28.76.. SQ. IN.
30.57. DEFLECTION GROSS CONTACT AREA 35.72. SQ. IN.
OPERATOR .... DATE 2/28/78 SERIAL NR. ......A028C4.....

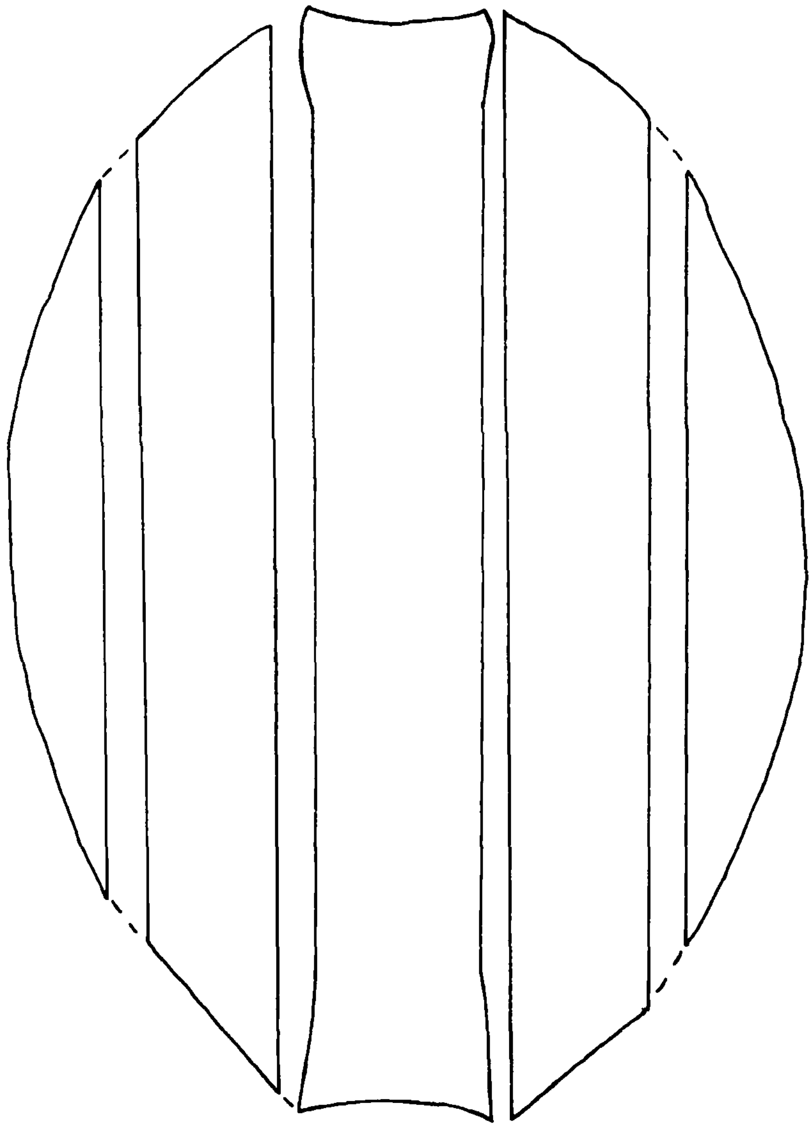


Figure C-7. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ..7.00-8.............. MFR Zedron........
NEW ..X... USED .... RETREAD BY ....N/A..........................
S. O. NO. ....77-21........ CODE NO. ....19... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..6.38..... IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. .4.36... IN.
[illegible] RATED LOAD .3990........ LBS. NET CONTACT AREA ...17.13 SQ. IN.
[illegible] DEFLECTION GROSS CONTACT AREA .21.91 SQ. IN.
OPERATOR .... DATE 2/28/78 SERIAL NR. ..A028C4..........

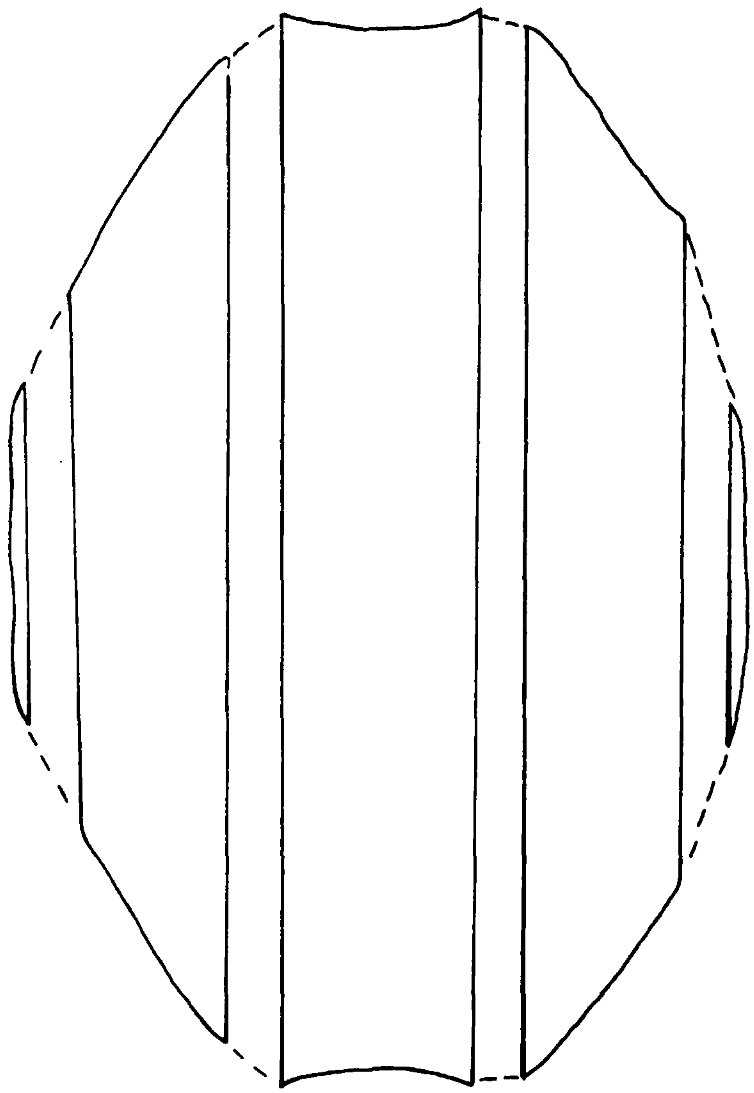


Figure C-8. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE .7.00-8.............. MFR Zedron..
NEW ...X.. USED .... RETREAD BY N/A..............................
S. O. NO. .....77-21....... CODE NO. ..3........ FLPL .X... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..7.63.. IN.
RATED INFLATION ...125......... PSI MAX. FOOTPRINT WDTH. ..6.49.. IN.
.100. % RATED LOAD 6650......... LBS. NET CONTACT AREA ..36.85. SQ. IN.
.25.24. DEFLECTION GROSS CONTACT AREA 43.36. SQ. IN.
OPERATOR .... DATE 2/28/78 SERIAL NR. ....B097A3....

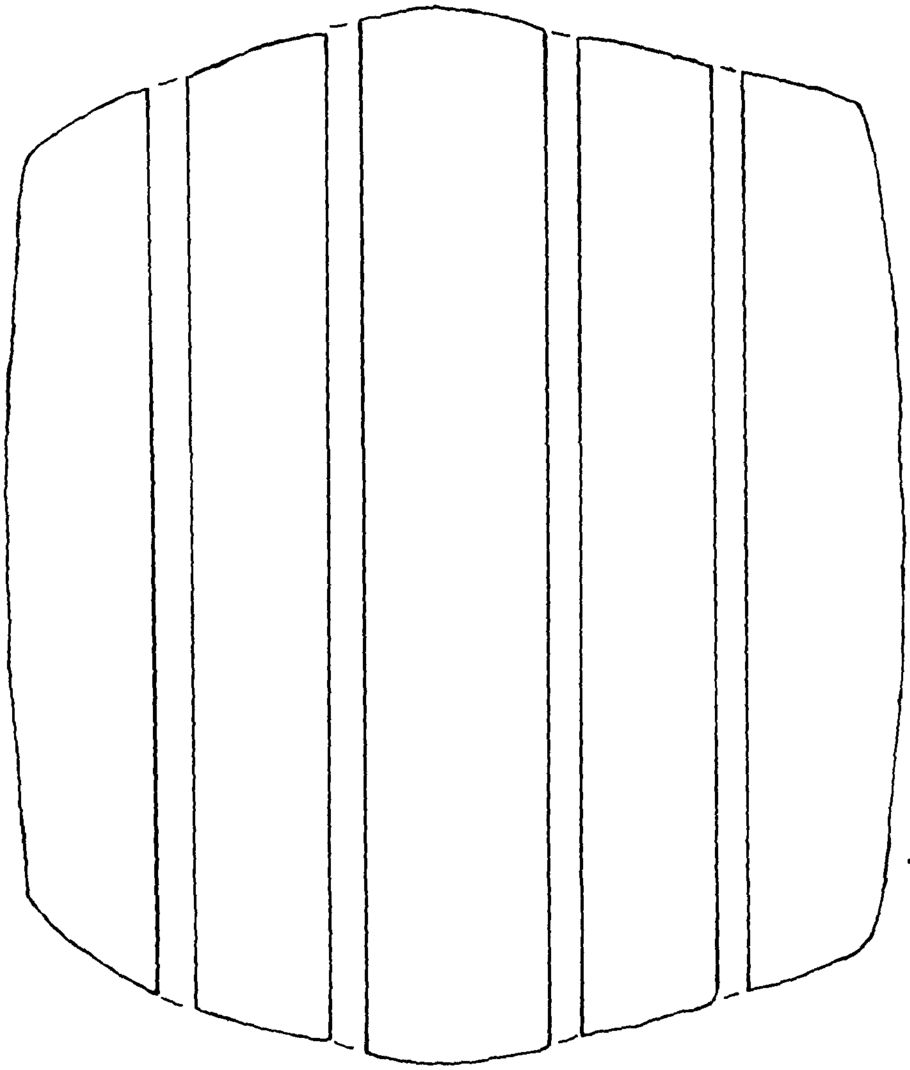


Figure C-9. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ...7.00-8........ .... MFR Zedron..
NEW ..X... USED .... RETREAD BY ....N/A......................
S. O. NO. .....77-21....... CODE NO. .3......... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..5.95.. IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. ..6.24.. IN.
60... % RATED LOAD ..3990........ LBS. NET CONTACT AREA ..25.5.. SQ. IN.
16.22.. DEFLECTION GROSS CONTACT AREA 30.44. SQ. IN.
OPERATOR .... DATE 2/28/78 SERIAL NR. ...B097A3.........

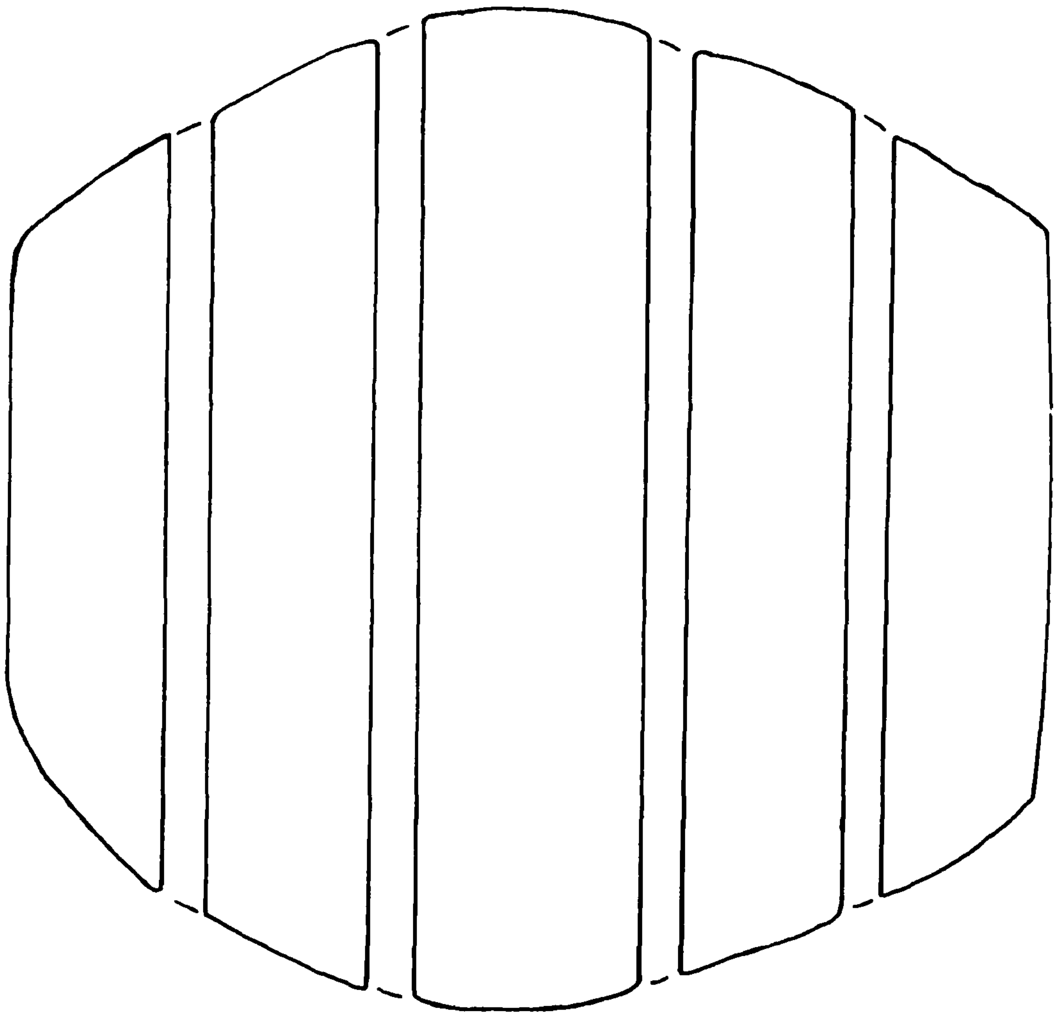


Figure C-10. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ..7.00-8.............. MFR .Zedron.
NEW ..X... USED .... RETREAD BY ...N/A..........................
S. O. NO. .....77-21......... CODE NO. ...B028B4.. FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..7.27.. IN.
RATED INFLATION ....125......... PSI MAX. FOOTPRINT WDTH. ..6.37.. IN.
100. % RATED LOAD .6650......... LBS. NET CONTACT AREA ...35.74 SQ. IN.
22.95. DEFLECTION GROSS CONTACT AREA .40.76 SQ. IN.
OPERATOR .... DATE 3/1/78 SERIAL NR. ....B028B4........

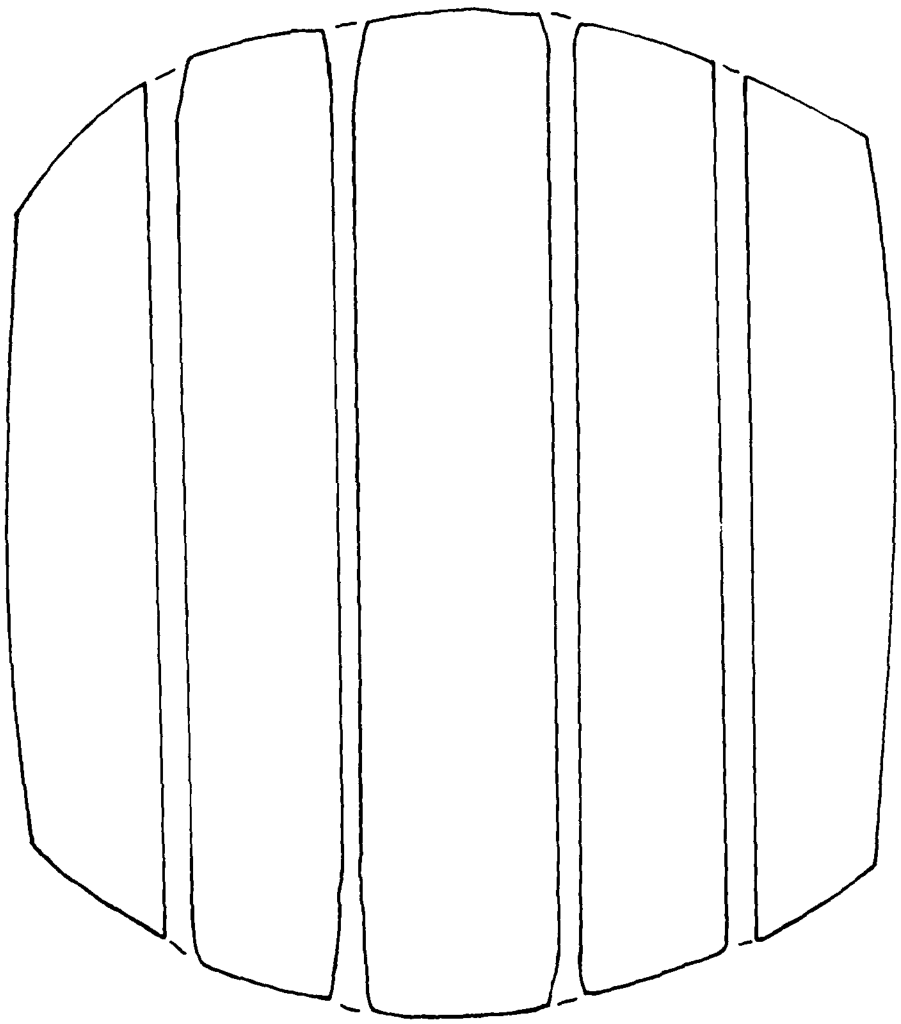


Figure C-11. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ..7.00-8.............. MFR Zedron..

NEW ..X... USED .... RETREAD BY ....N/A............................

S. O. NO. ....77-21......... CODE NO. ....9...... FLPL ..X.. FLWHL .....

SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..5.78.. IN.

RATED INFLATION ..125.......... PSI MAX. FOOTPRINT WDTH. ..6.25.. IN.

..60.% RATED LOAD 3990.......... LBS. NET CONTACT AREA ...23.82 SQ. IN.

.14.64 DEFLECTION GROSS CONTACT AREA .28.76 SQ. IN.

OPERATOR .... DATE 3/1/78 SERIAL NR. ...B028B4..........

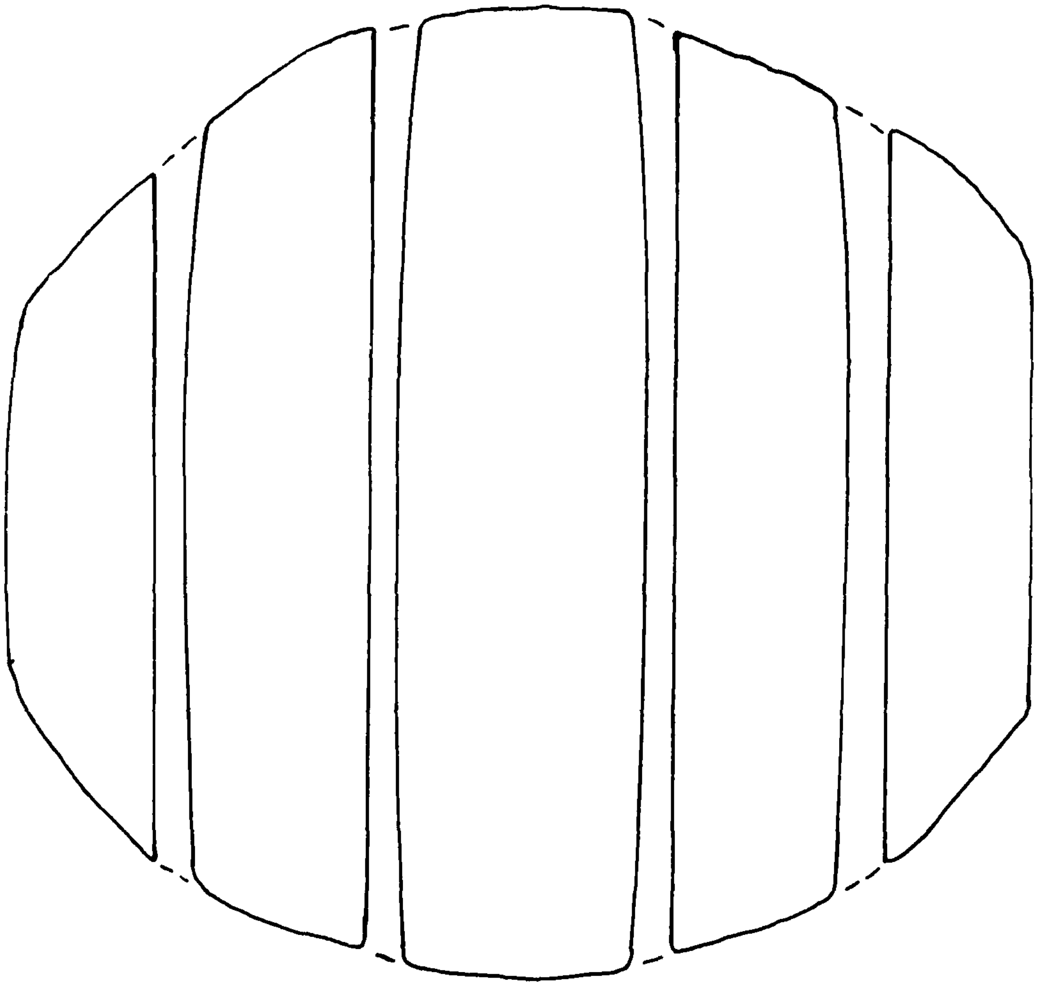


Figure C-12. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ......7.00-8............ MFR Zedron..
NEW ...X.. USED .... RETREAD BY ......N/A.......................
S. O. NO. ...77-21......... CODE NO. ..11....... FIPL ...Y FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .7.563.. IN.
RATED INFLATION ......125...... PSI MAX. FOOTPRINT WDTH. .6.125.. IN.
.100 % RATED LOAD ...6650...... LBS. NET CONTACT AREA ...37.46 SQ. IN.
.35.99 DEFLECTION GROSS CONTACT AREA .41.19 SQ. IN.
OPERATOR .... DATE 3/14/79 SERIAL NR. ..B068C1..........

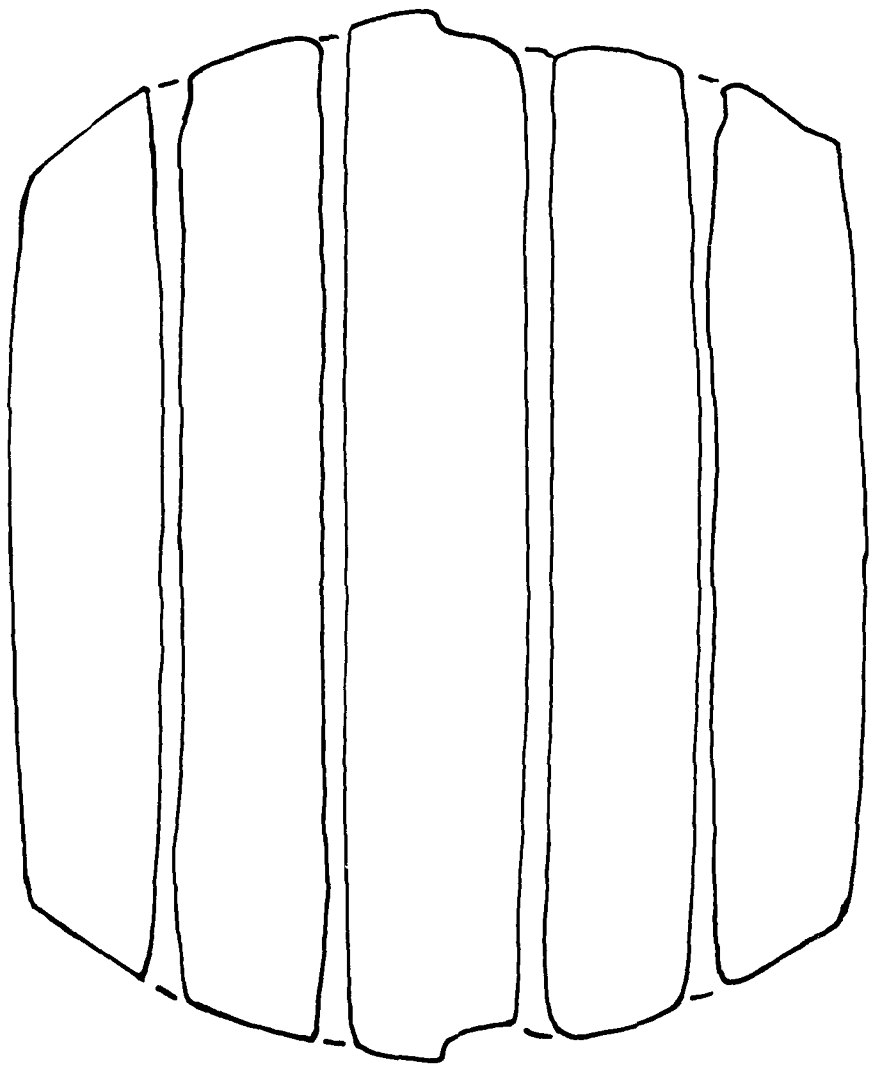


Figure C-13. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8.......... MFR Zedron.
NEW ..X.... USED .... RETREAD BY ....N/A..........................
S. O. NO. ...77-21.......... CODE NO. ....11..... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.156.. IN.
RATED INFLATION .125............ PSI MAX. FOOTPRINT WDTH. .5.938.. IN.
..60.% RATED LOAD ......3990..... LBS. NET CONTACT AREA ...25.49 SQ. IN.
.17.14. DEFLECTION GROSS CONTACT AREA .29.21 SQ. IN.
OPERATOR .... DATE 3/14/79 SERIAL NR. ..B058C1..........

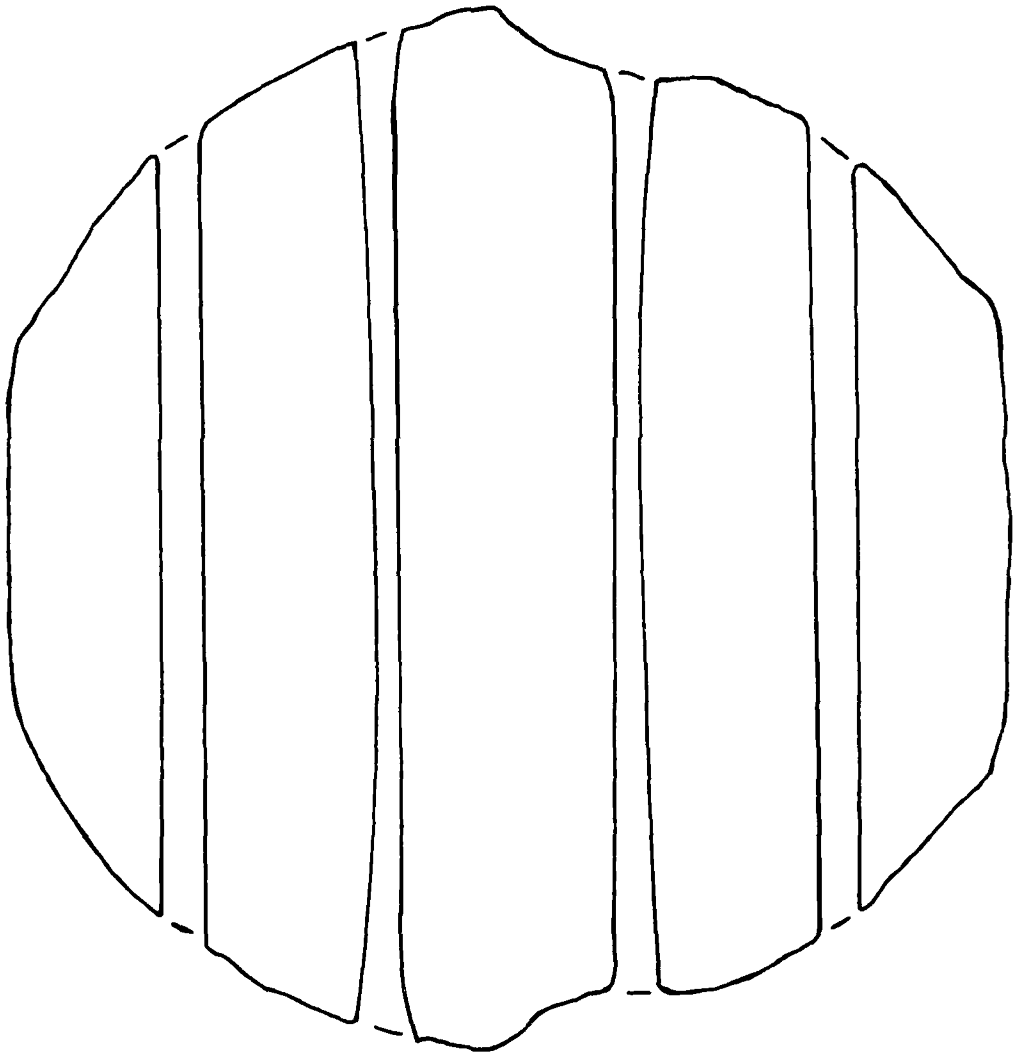


Figure C-14. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ..7.00-8.............. MFR Zedron..
NEW ....X.. USED .... RETREAD BY .N/A............................
S. O. NO. ..77-21........... CODE NO. ....19..... FLPL .X... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .7.906.. IN.
RATED INFLATION ...125........ PSI MAX. FOOTPRINT WDTH. .6.156.. IN.
100 % RATED LOAD ......6650...... LBS. NET CONTACT AREA 36.19.... SQ. IN.
26.06 DEFLECTION GROSS CONTACT AREA .40.83 SQ. IN.
OPERATOR .... DATE 3/9/79 SERIAL NR. ..B078C4..............

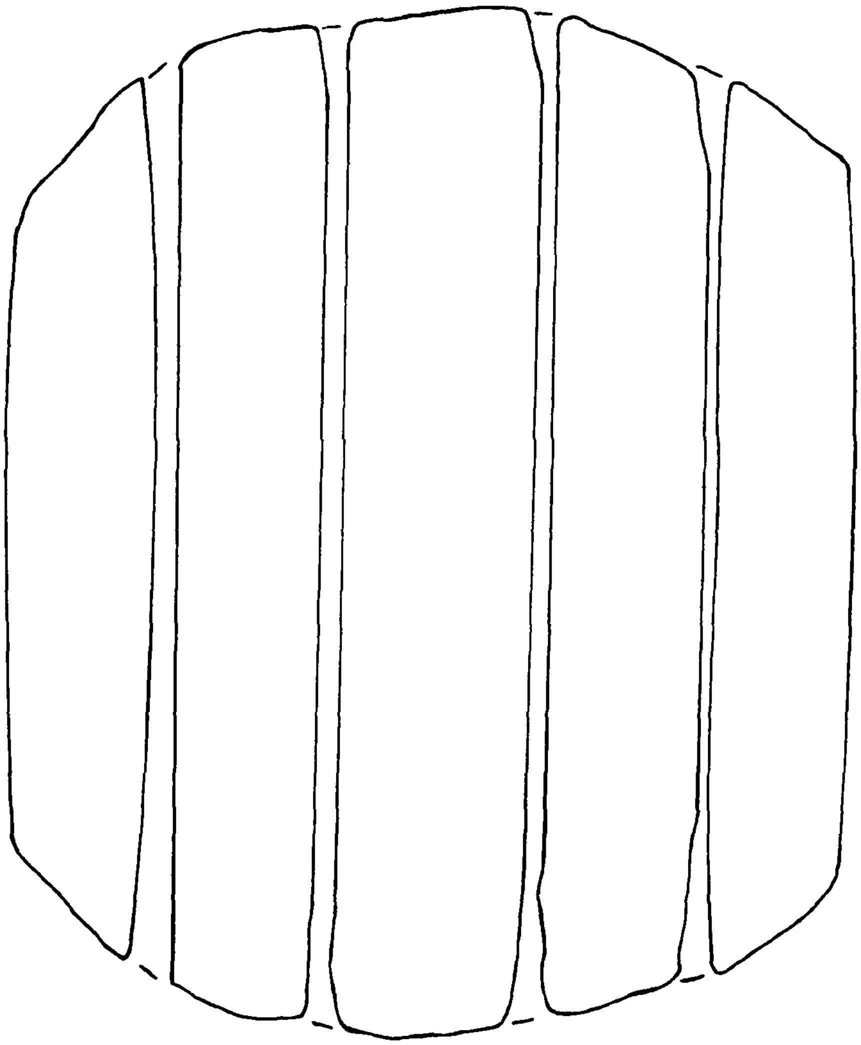


Figure C-15. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ...7.00-8... MFR Zedron
NEW ..X... USED .... RETREAD BY ..N/A...
S. O. NO. ...77-21... CODE NO. ...19..... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..6.063. IN.
RATED INFLATION ...125... PSI MAX. FOOTPRINT WDTH. ..5.938. IN.
..60..% RATED LOAD .....3990... LBS. NET CONTACT AREA ...24.01 SQ. IN.
..17.13.. DEFLECTION GROSS CONTACT AREA .28.23 SQ. IN.
OPERATOR .... DATE 3/9/79 SERIAL NR. ..BQ78C4.........

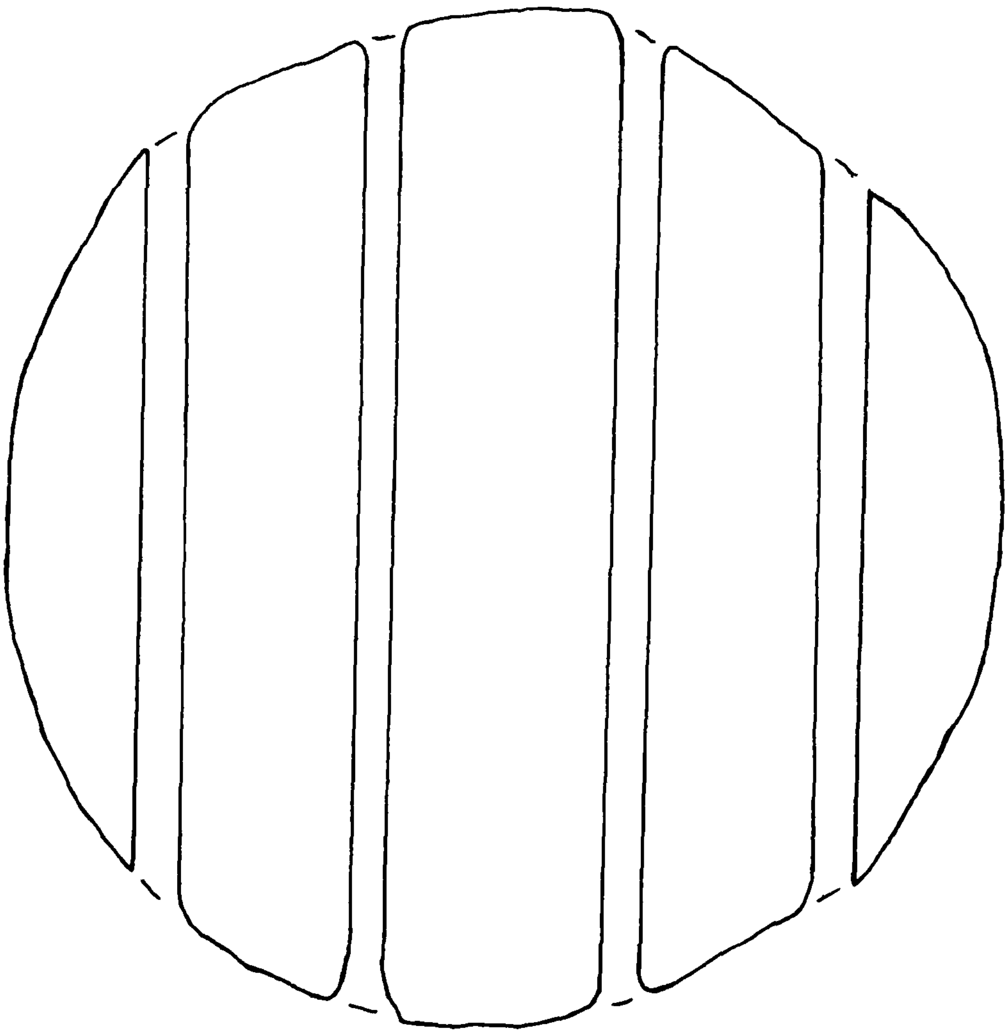


Figure C-16. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8.......... MFR Goodrich...
NEW ..X.... USED .... RETREAD BY ......N/A......................
S. O. NO. ..77-21........... CODE NO. ....23...... TYPE ..V.. TL/WBL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .7.153.. IN.
RATED INFLATION ....125......... PSI MAX. FOOTPRINT WDTH. .6.156 . IN.
.100 % RATED LOAD ......6650... LBS. NET CONTACT AREA ..[illegible].. SQ. IN.
.20.791 DEFLECTION GROSS CONTACT AREA 38.98.. SQ. IN.
OPERATOR .... DATE 3/7/79 SERIAL NR. ...B08893.........

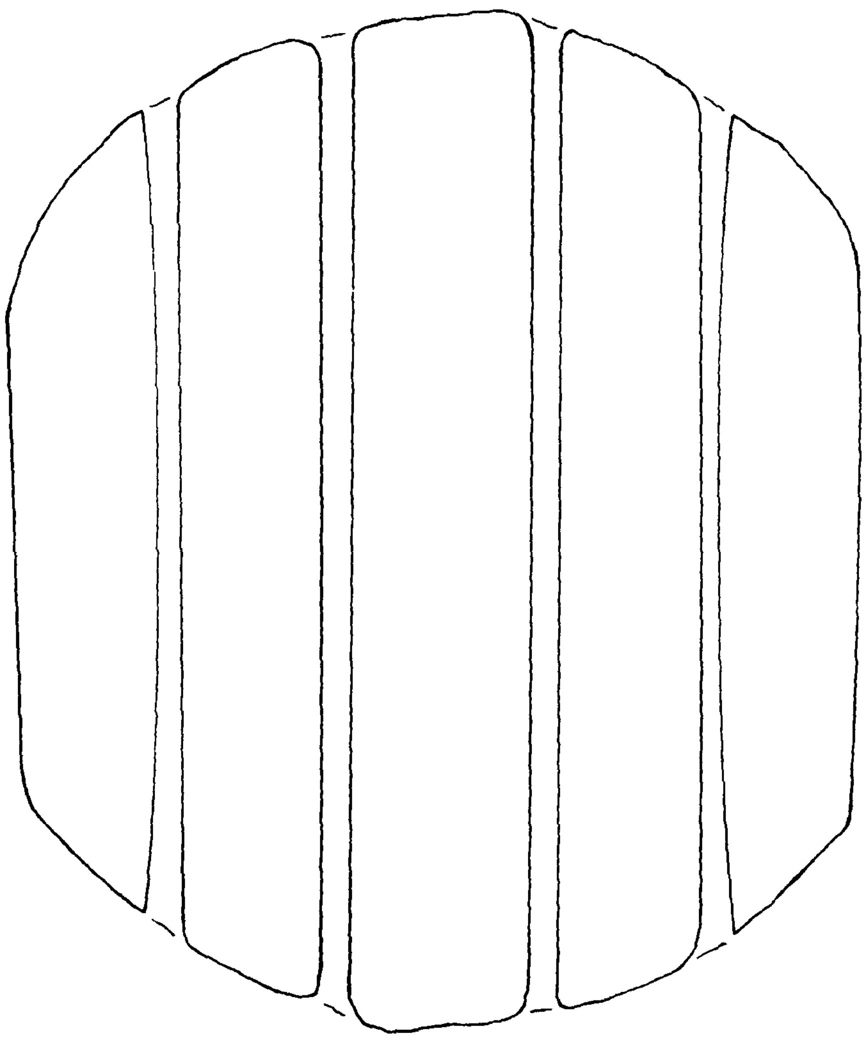


Figure C-17. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8........ MFR Zedron

NEW ..X... USED .... RETREAD BY ..N/A........

S. O. NO. ....77-21........ CODE NO. ....23...... FLPL ...X. FLWHL .....

SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .5.938.. IN.

RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. .5.750.. IN.

..60 % RATED LOAD ....3990...... LBS. NET CONTACT AREA ..23.78. SQ. IN.

.15.93 DEFLECTION GROSS CONTACT AREA 26.47. SQ. IN.

OPERATOR .... DATE 3/7/79 SERIAL NR. ..B088H3..........

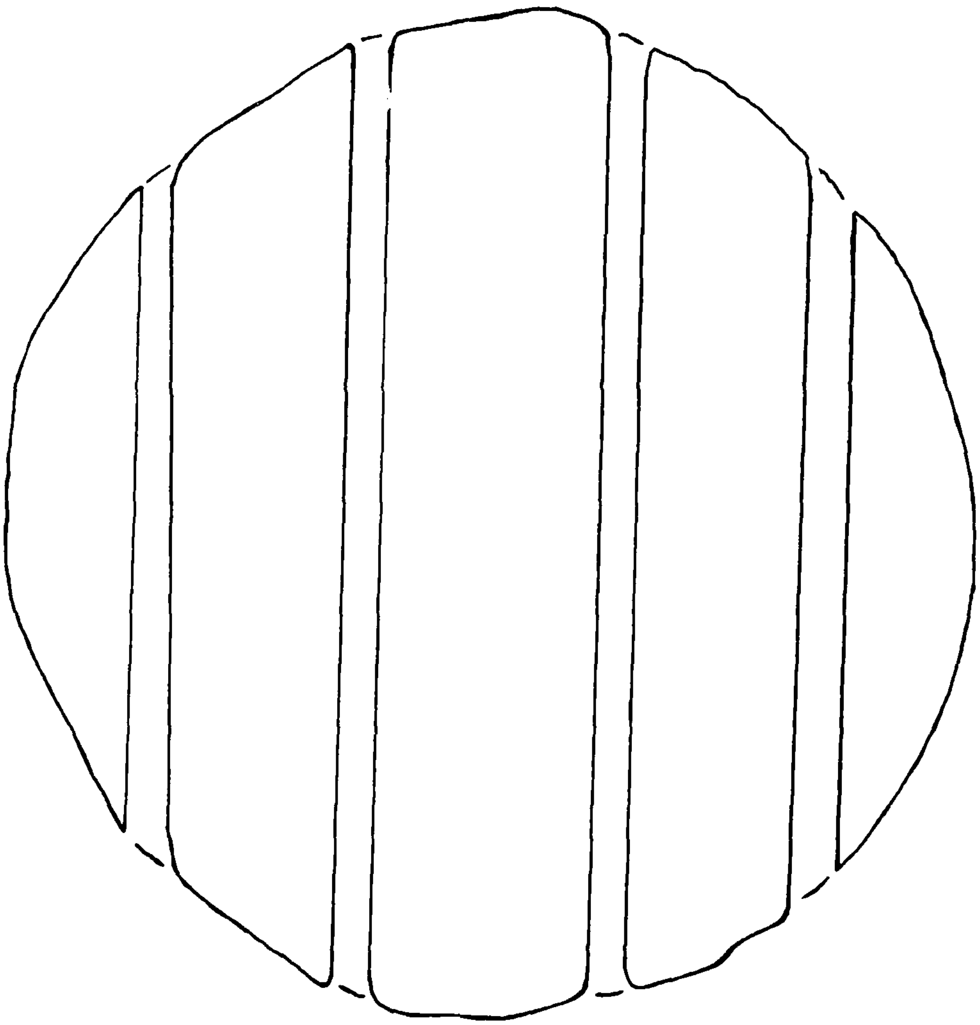


Figure C-18. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8........ MFR Zedron..
NEW X..... USED .... RETREAD BY N/A..............................
S. O. NO. ....77-21....... CODE NO. .....29..... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .7.750.. IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. .6.188.. IN.
.100. % RATED LOAD ...6650...... LBS. NET CONTACT AREA ..38.02. SQ. IN.
.25.64. DEFLECTION GROSS CONTACT AREA 42.08. SQ. IN.
OPERATOR .... DATE 2/27/78 SERIAL NR. ..B088I4..........

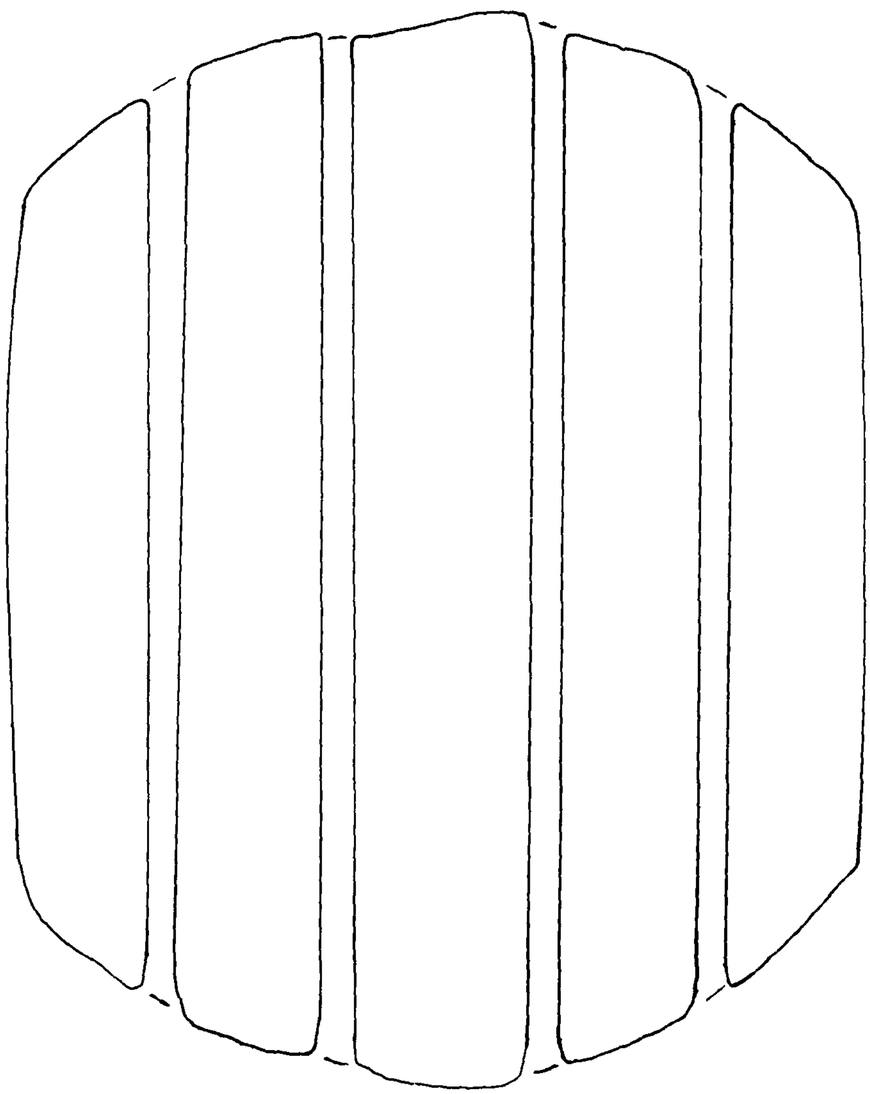


Figure C-19. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....00-8........ MFR Zedron.
NEW ..X.... USED .... RETREAD BY ....N/A....................
S. O. NO. ....77-21........ CODE NO. ....29.. FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ...188. IN.
RATED INFLATION ...125.......... PSI MAX. FOOTPRINT WDTH. ..6.000.. IN.
..60.% RATED LOAD .....3990.... LBS. NET CONTACT AREA ..35.61.. SQ. IN.
.17.06. DEFLECTION GROSS CONTACT AREA [illegible] IN.
OPERATOR .... DATE 2/27/79 SERIAL NR. .808814...........

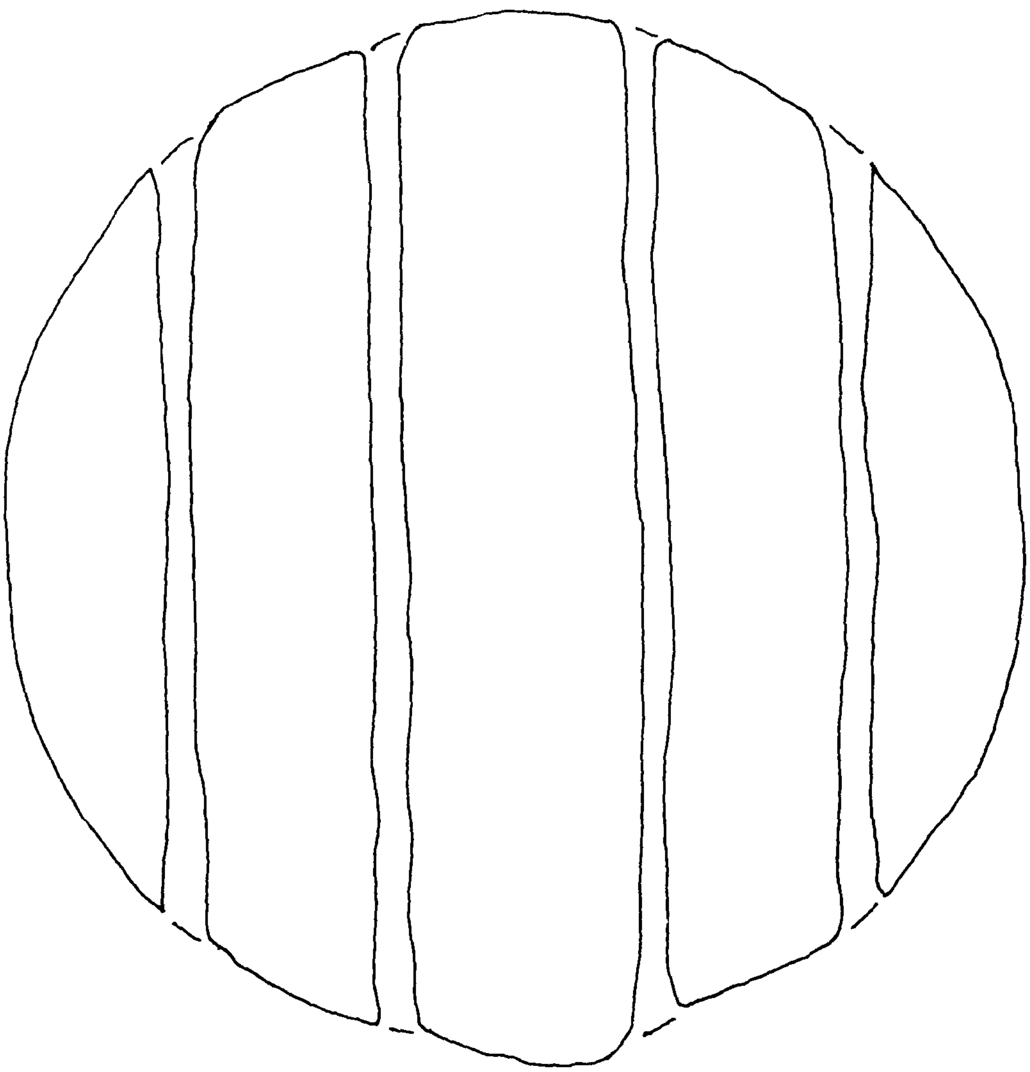


Figure C-20. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ..7.00-8.............. MFR Zedron...
NEW ..x... USED .... RETREAD BY ..N/A..........................
S. O. NO. .....77-21....... CODE NO. ...33...... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 7.00.... IN.
RATED INFLATION .125............ PSI MAX. FOOTPRINT WDTH. 6.19.... IN.
100. % RATED LOAD ...6650...... LBS. NET CONTACT AREA ...34.38 SQ. IN.
20.43. DEFLECTION GROSS CONTACT AREA .38.04 SQ. IN.
OPERATOR .... DATE 11/9/78 SERIAL NR. ....B08813..........

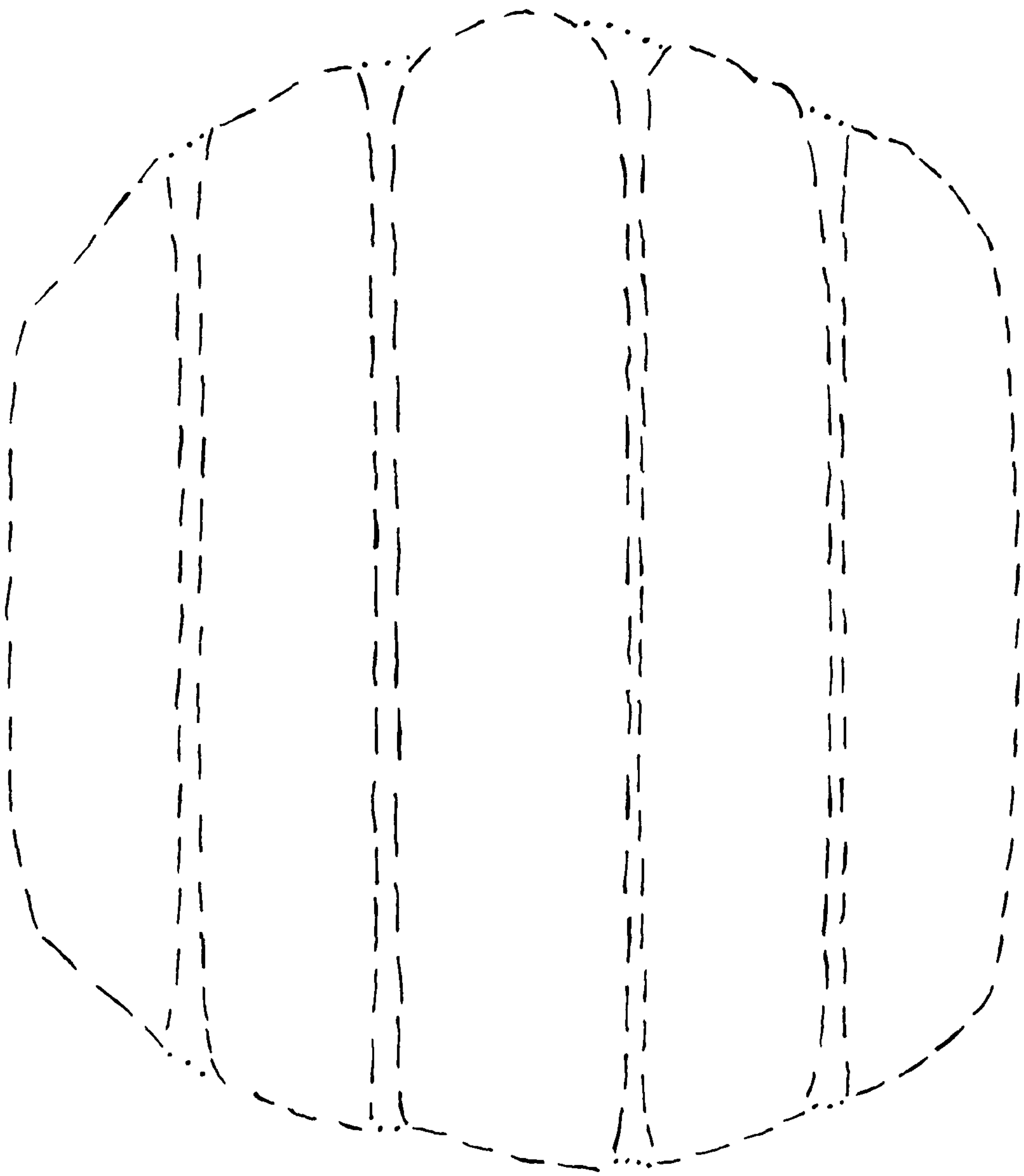


Figure C-21. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8.................. MFR Zedron
NEW ..X... USED .... RETREAD BY ....N/A..............................
S. O. NO. ...77-21.......... CODE NO. ....33..... FLPL ..X.. FLWHL.....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ...6.00.. IN.
RATED INFLATION ...125......... PSI MAX. FOOTPRINT WDTH. ...5.81.. IN.
.60 % RATED LOAD ...3990...... LBS. NET CONTACT AREA ...23.80 SQ. IN.
.13..71. DEFLECTION GROSS CONTACT AREA .26.42 SQ. IN.
OPERATOR .... DATE 11/9/78 SERIAL NR. ..B08813..........

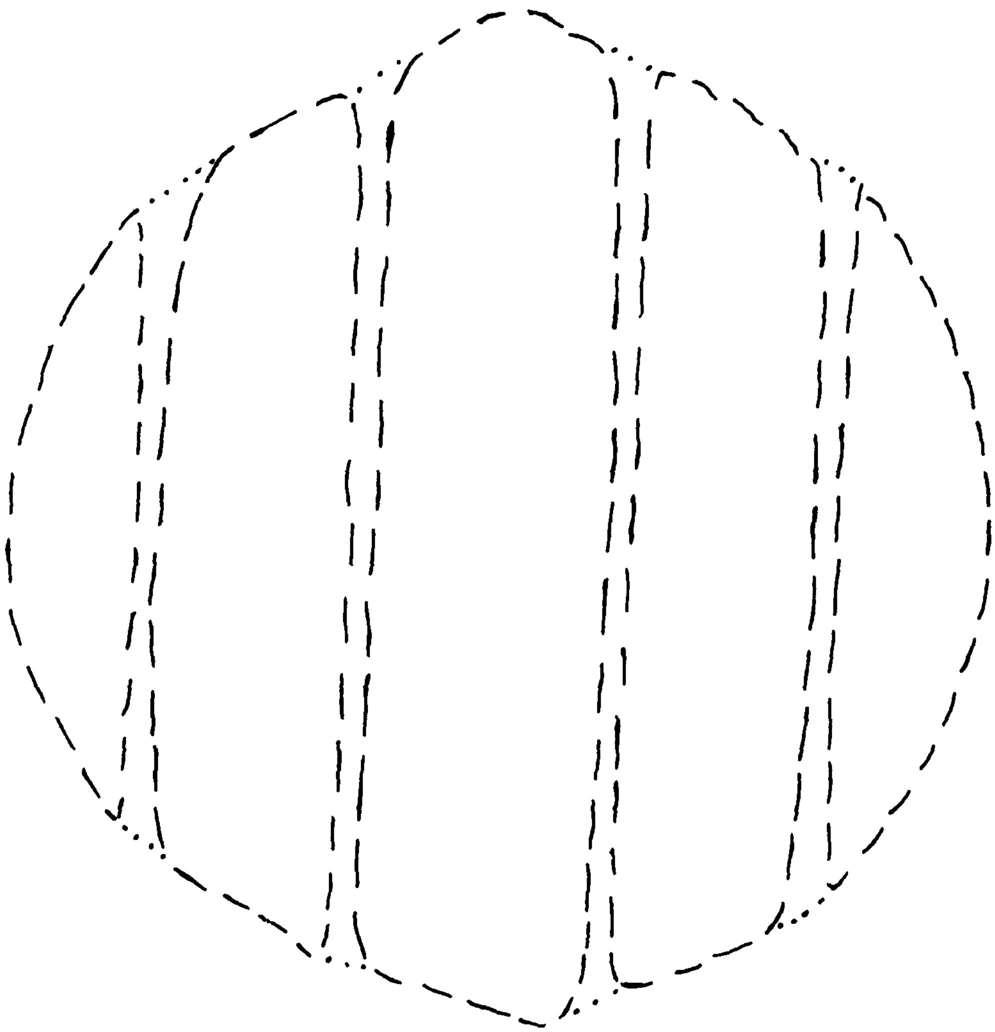


Figure C-22. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8 MFR Zedron
NEW X USED RETREAD BY N/A
S. O. NO. 77-21 CODE NO. 39 FLPL X FLWHL
SKID DEPTH ... IN. MAX. FOOTPRINT LGTH. 7.250 IN.
RATED INFLATION 125 PSI MAX. FOOTPRINT WDTH. 6.188 IN.
100 % RATED LOAD 6650 LBS. NET CONTACT AREA 36.07 SQ. IN.
23.22 DEFLECTION GROSS CONTACT AREA 38.99 SQ. IN.
OPERATOR ... DATE 3/2/79 SERIAL NR. B088K4

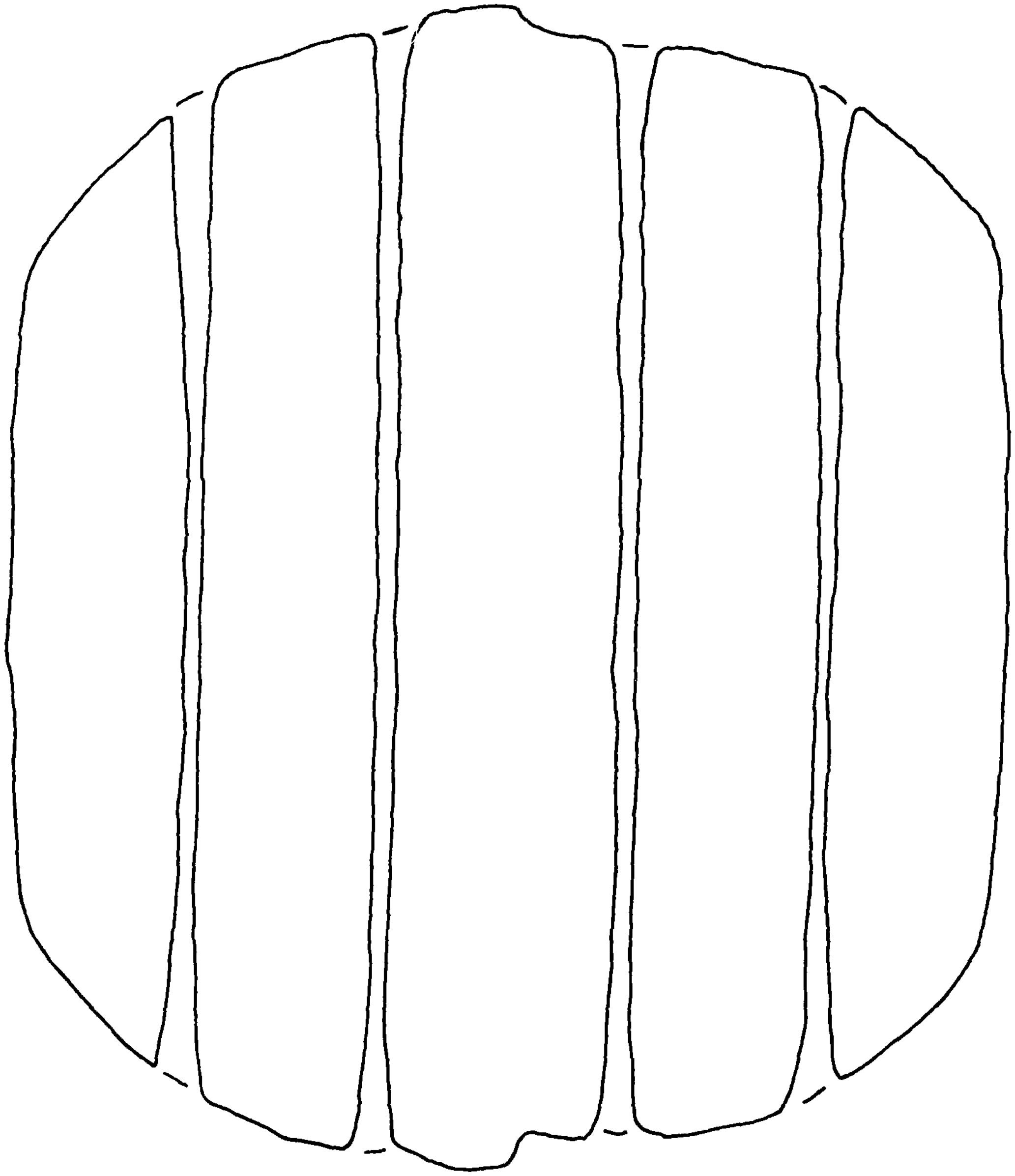


Figure C-23. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8 MFR Zedron
NEW X USED RETREAD BY N/A
S. O. NO. 77-21 CODE NO. 39 FLPL X FLWHL
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 5.938 IN.
RATED INFLATION 125 PSI MAX. FOOTPRINT WDTH. 5.781 IN.
[illegible] RATED LOAD 3990 LBS. NET CONTACT AREA 23.91 SQ. IN.
[illegible] DEFLECTION GROSS CONTACT AREA 26.96 SQ. IN.
OPERATOR .... DATE 3/2/79 SERIAL NR. B088K4

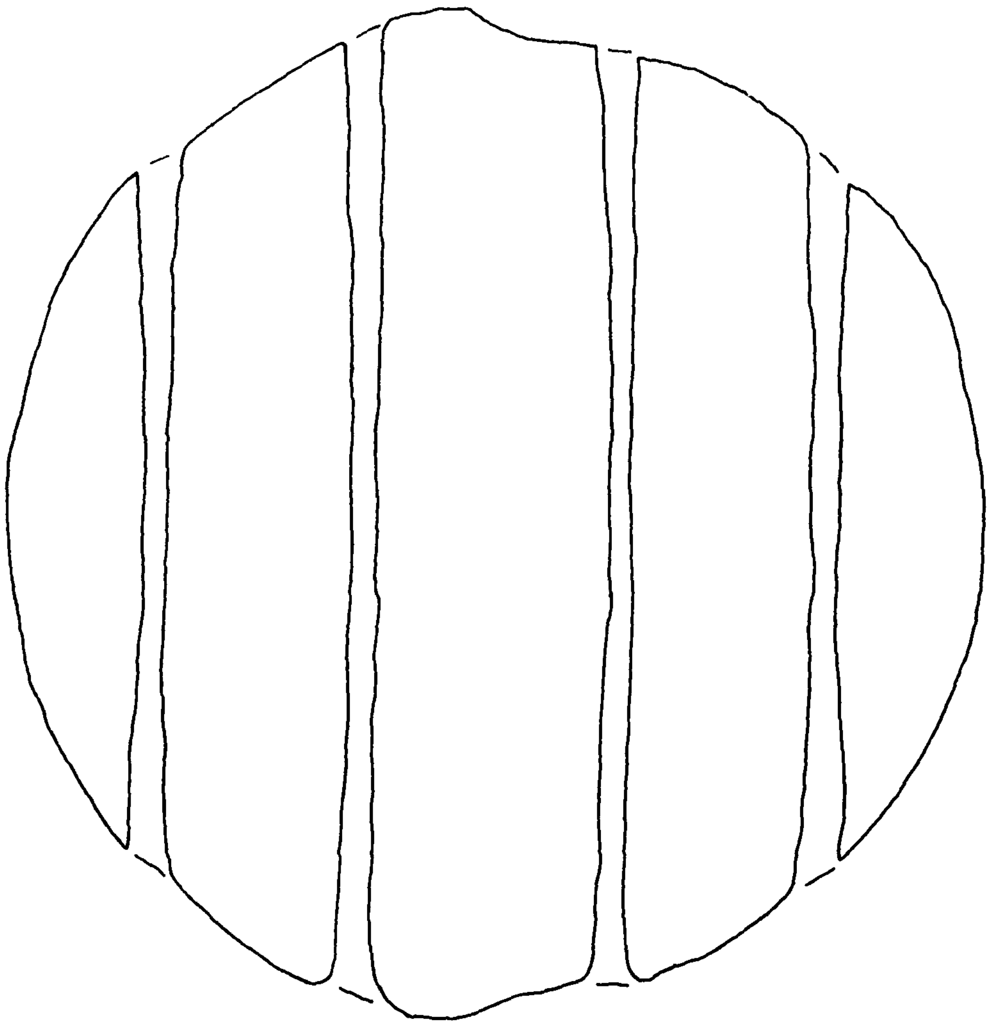


Figure C-24. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-18.... MFR ..Zedron..
NEW ..X.. USED .... RETREAD BY ....N/A....
S. O. NO. ....77-21.... CODE NO. ....43.... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..6.750.. IN.
RATED INFLATION ....125.... PSI MAX. FOOTPRINT WDTH. ..6.063.. IN.
..100.. % RATED LOAD ....6650.... LBS. NET CONTACT AREA ..30.77.. SQ. IN.
..19.07.. DEFLECTION GROSS CONTACT AREA ..34.23.. SQ. IN.
OPERATOR .... DATE 3/1/79 SERIAL NR. ..B09813........

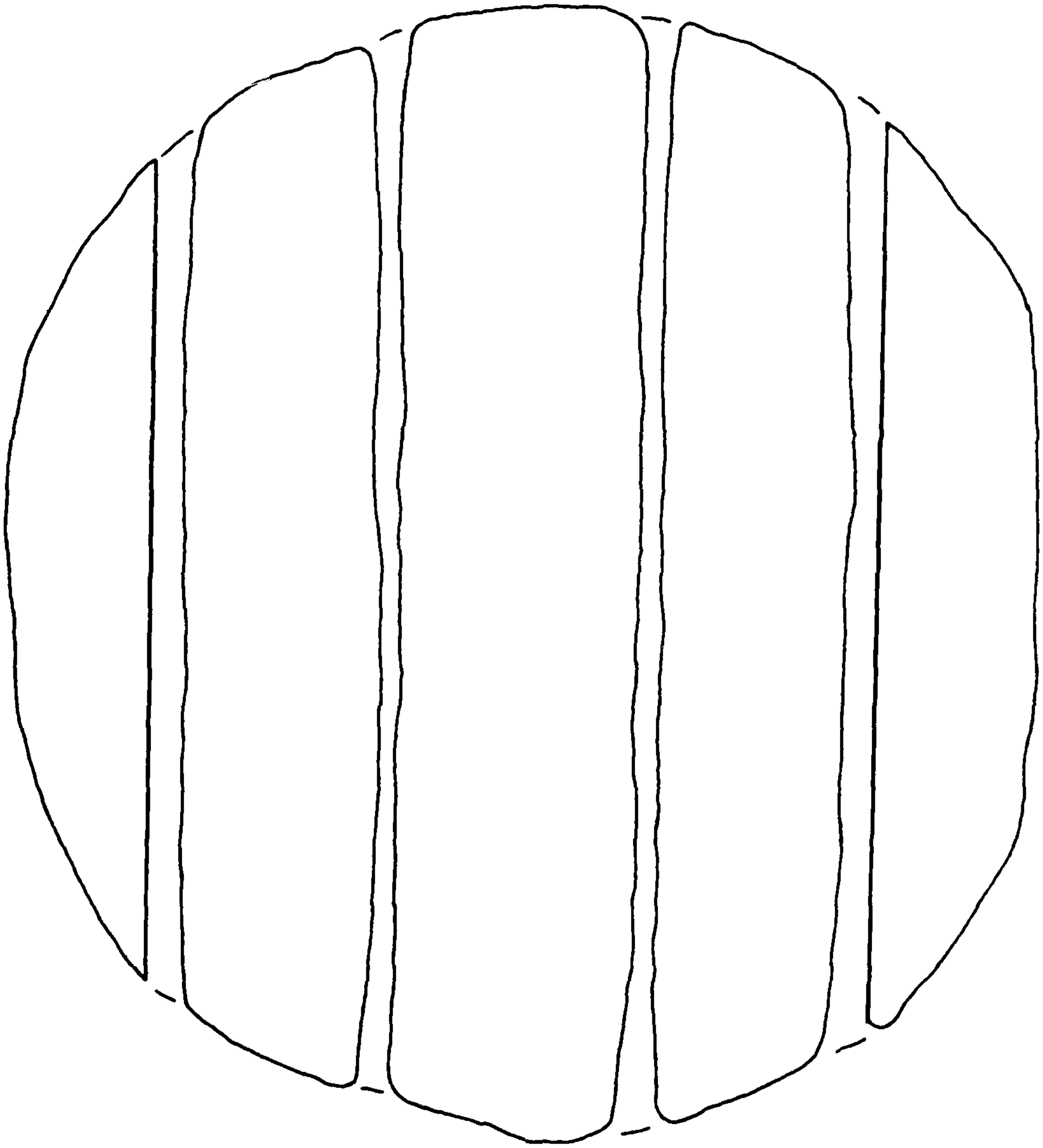


Figure C-25. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8 MFR Zedron
NEW X .... USED .... RETREAD BY N/A
S. O. NO. 77-21 .... CODE NO. 43 .... FLPL X .... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 5.438 IN.
RATED INFLATION 125 ..... PSI MAX. FOOTPRINT WDTH. 5.375 IN.
60 % RATED LOAD 3990 ..... LBS. NET CONTACT AREA 20.07 SQ. IN.
13.01 DEFLECTION GROSS CONTACT AREA 22.84 SQ. IN.
OPERATOR .... DATE 3/1/79 SERIAL NR. B09813 ....

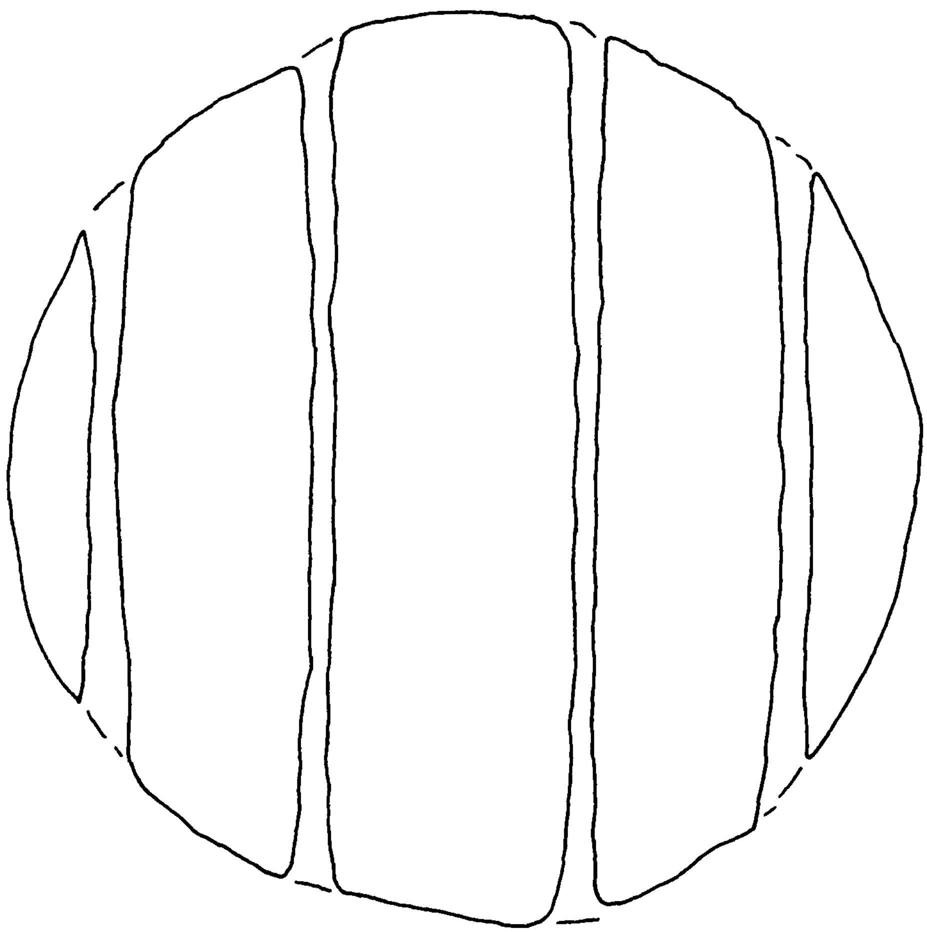


Figure C-26. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8 CAST.... MFR Zedron..
NEW ..X.. USED .... RETREAD BY ..N/A..........................
S. O. NO. .....77-21........ CODE NO. ....47..... FLPL .X... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.375.. IN.
RATED INFLATION .....125...... PSI MAX. FOOTPRINT WDTH. .6.25... IN.
.100 % RATED LOAD ...6650....... LBS. NET CONTACT AREA ...31.95 SQ. IN.
.18.60. DEFLECTION GROSS CONTACT AREA .34.80 SQ. IN.
OPERATOR .... DATE 11/15/78 SERIAL NR. ..B098M2..........

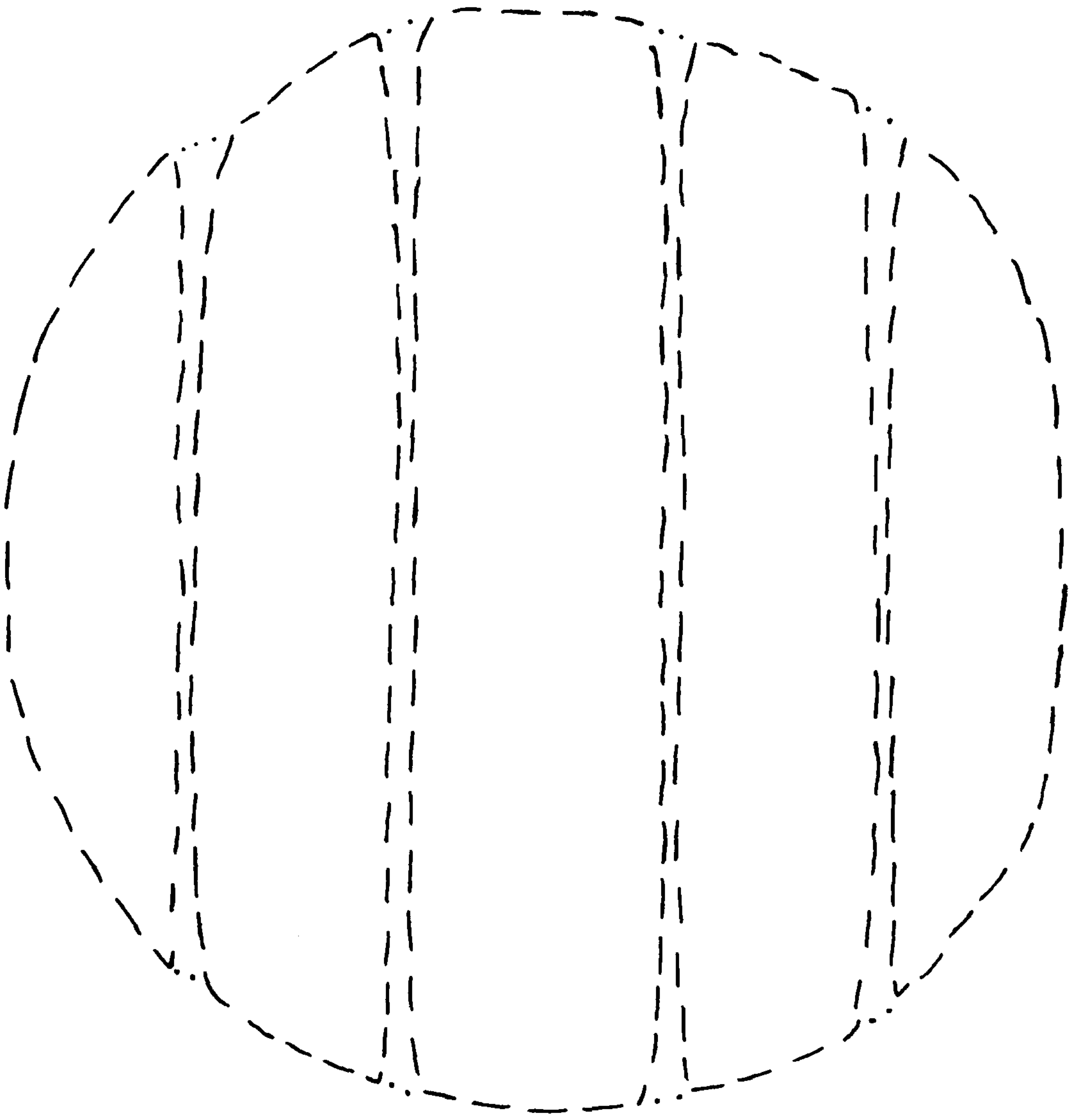


Figure C-27. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 700-8 CAST .... MFR Zedron
NEW X ...... USED ...... RETREAD BY N/A
S. O. NO. 77-21 .... CODE NO. 47 .... TYPE Y .... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 5.375 IN.
RATED INFLATION 125 .... PSI MAX. FOOTPRINT WDTH. 5.313 IN.
60 % RATED LOAD 3990 .... LBS. NET CONTACT AREA 20.23 SQ. IN.
12.77 DEFLECTION GROSS CONTACT AREA 22.50 SQ. IN.
OPERATOR .... DATE 11/15/78 SERIAL NO. B09892 ....

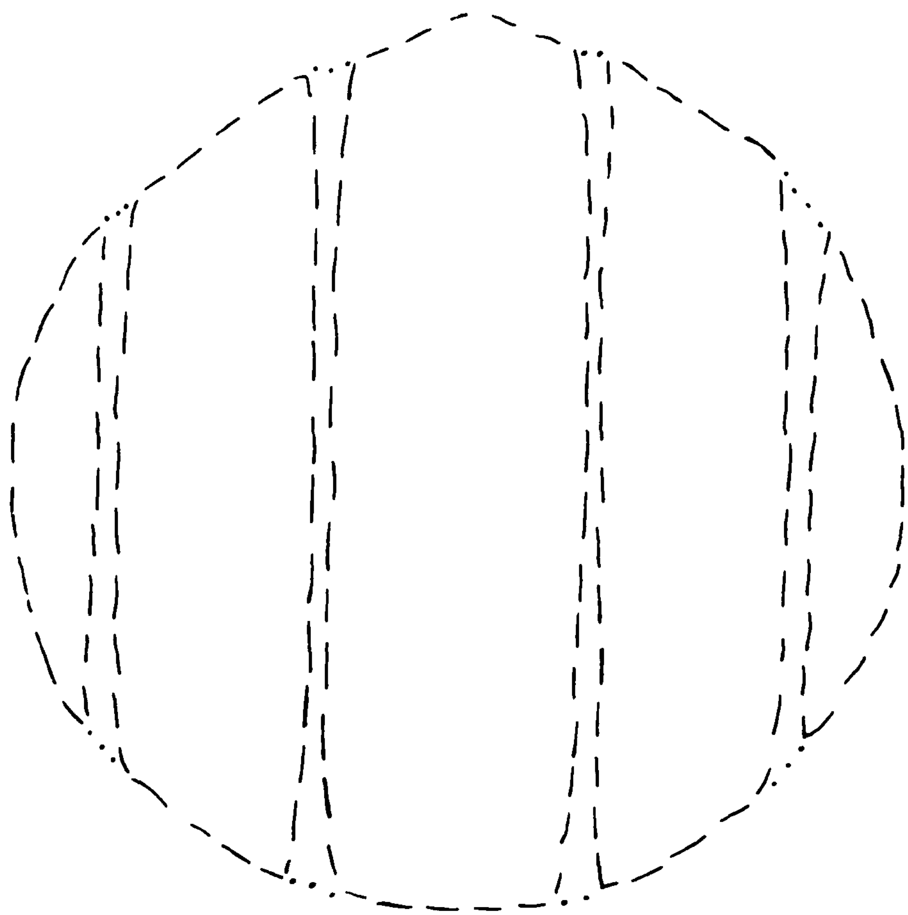


Figure C-28. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8.....CAST.... MFR Zedron..
NEW ..X... USED .... RETREAD BY ....N/A......................
S. O. NO. ....77-21........ CODE NO. 52.......... FLPL X.... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..6.875.. IN.
RATED INFLATION ....125......... PSI MAX. FOOTPRINT WDTH. ..6.25... IN.
..100 % RATED LOAD .6650......... LBS. NET CONTACT AREA ....33.55 SQ. IN.
..19.64 DEFLECTION GROSS CONTACT AREA ...37.17 SQ. IN.
OPERATOR .... DATE 11/16/78 SERIAL NR. ...B098N2.........

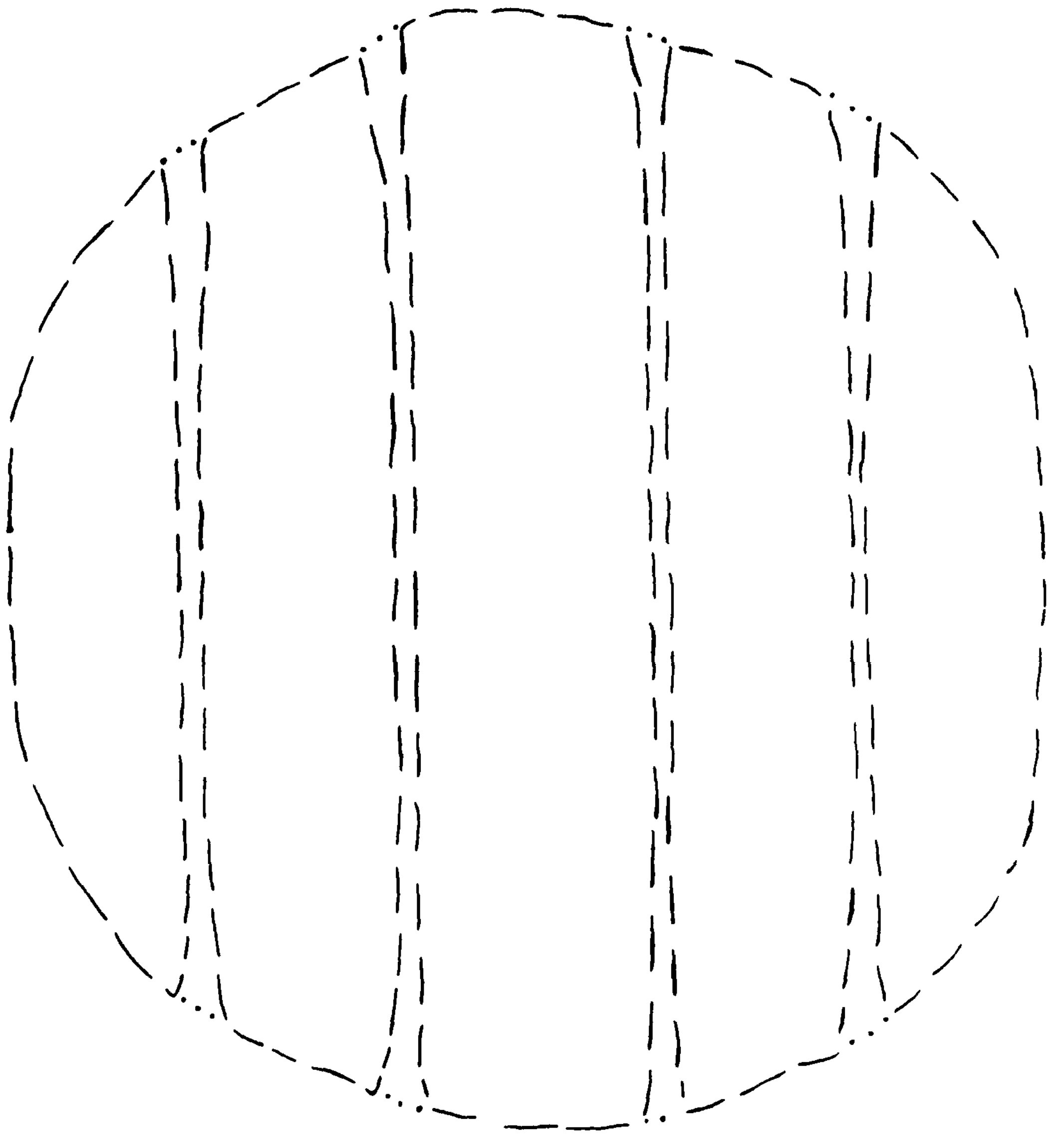


Figure C-29. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8 CAST MFR Zedron
NEW X USED .... RETREAD BY N/A
S. O. NO. 77-21 CODE NO. 52 FLPL X FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 5.75 IN.
RATED INFLATION 125 PSI MAX. FOOTPRINT WDTH. 5.625 IN.
60 % RATED LOAD 3990 LBS. NET CONTACT AREA 21.04 SQ. IN.
13.58 DEFLECTION GROSS CONTACT AREA 24.78 SQ. IN.
OPERATOR .... DATE 11/16/78 SERIAL NR. B09882

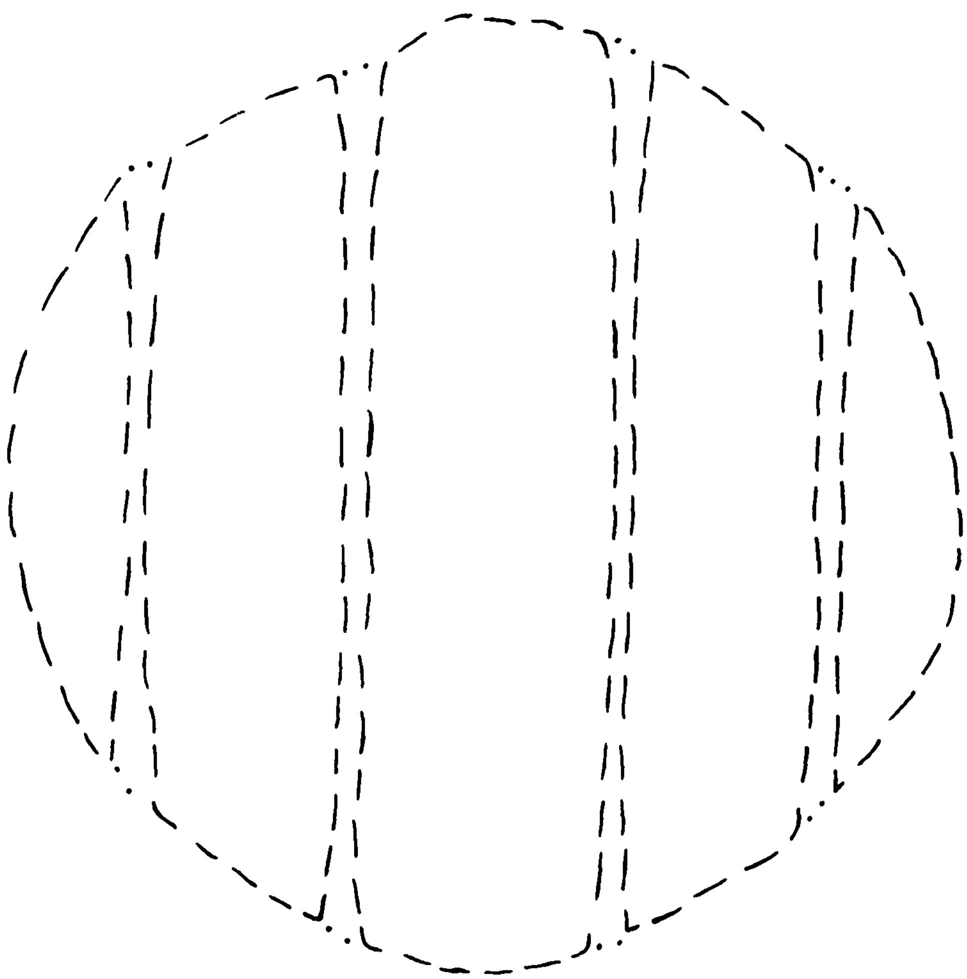


Figure C-30. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE .....7.00-8...CAST.... MFR Zedron..
NEW ..X... USED .... RETREAD BY N/A...............................
S. O. NO. .....77-21....... CODE NO. .....57.... FLPL ....X FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.94... IN.
RATED INFLATION ....125....... PSI MAX. FOOTPRINT WDTH. .6.313.. IN.
100 % RATED LOAD ..6650........ LBS. NET CONTACT AREA ...35.19 SQ. IN.
20.48 DEFLECTION GROSS CONTACT AREA .38.00 SQ. IN.
OPERATOR .... DATE 11/13/78 SERIAL NR. ...B09802.......

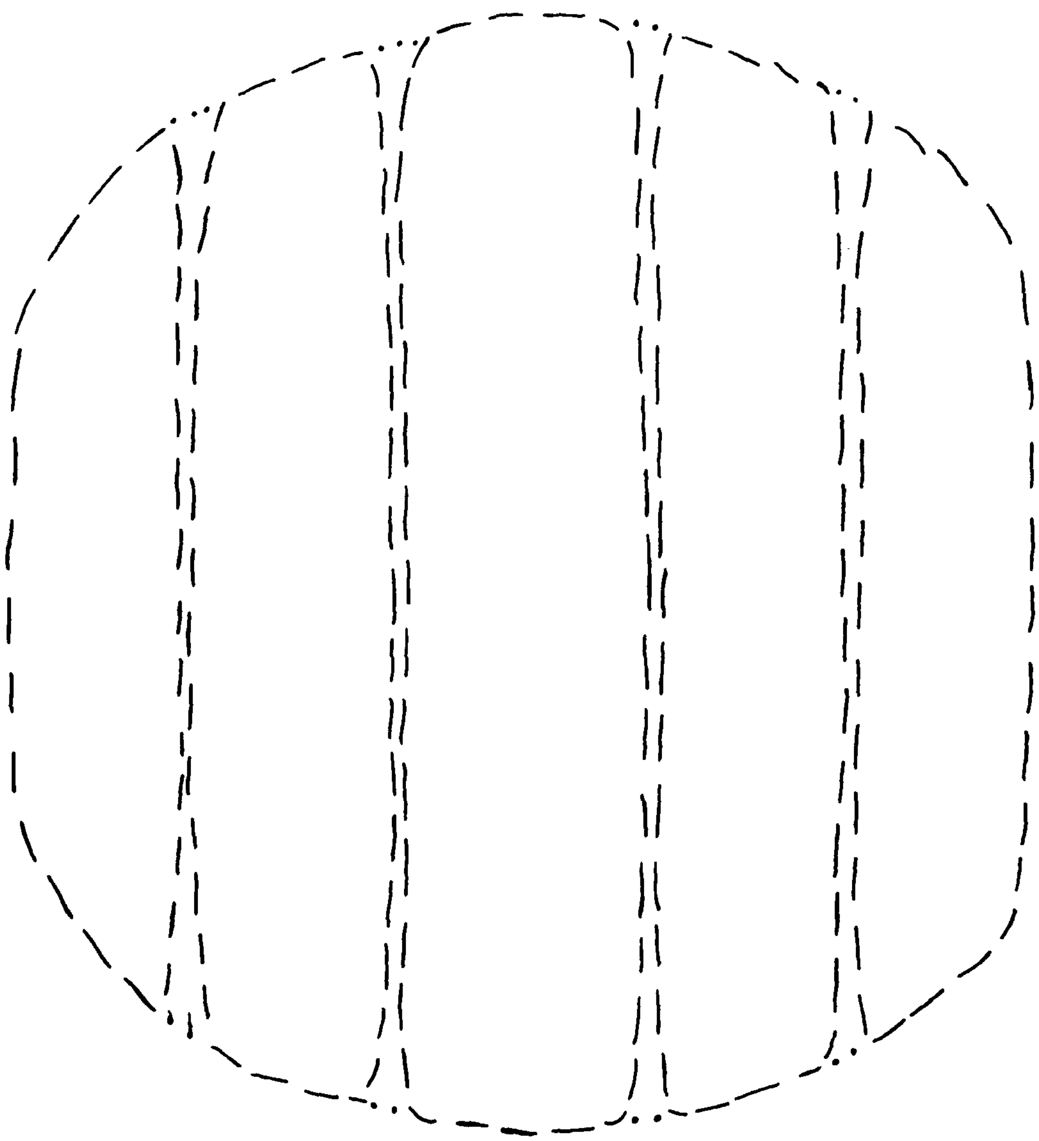


Figure C-31. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8....CAST.. MFR .Zedron.
NEW ...X.. USED .... RETREAD BY ....N/A..........................
S. O. NO. .....77-21....... CODE NO. 57.......... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..5.50.. IN.
RATED INFLATION ...125.......... PSI MAX. FOOTPRINT WDTH. ..5.625. IN.
...60.% RATED LOAD .....3990.... LBS. NET CONTACT AREA ...21.73 SQ. IN.
.13.85. DEFLECTION GROSS CONTACT AREA .24.86 SQ. IN.
OPERATOR .... DATE 11/13/78 SERIAL NR. ....B09802........

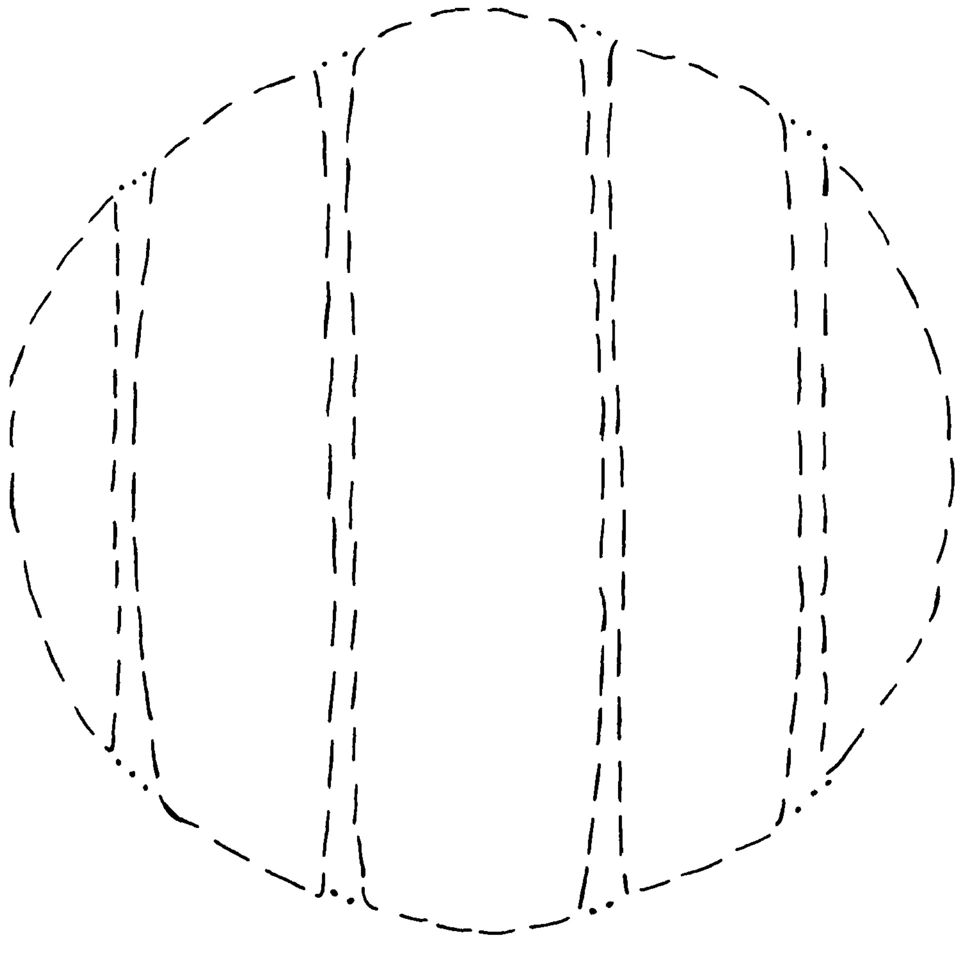


Figure C-32. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT TIRE SIZE ..[illegible]..........
NO. ..[illegible].. USED .... PETREAD ... N/A ....
S. N. No. ....[illegible]........ LOAD NO. ..[illegible]...... TIRE ...[illegible]... TEMP .....
SKID DEPTH .... IN. MAX. FOOTPRINT LENGTH ..[illegible].. IN.
RATED INFLATION ....[illegible]....... PSI MAX. FOOTPRINT WIDTH ..[illegible].. IN.
[illegible] RATED LOAD ..6650........ LBS. NET CONTACT AREA ...[illegible] SQ. IN.
[illegible] DEFLECTION GROSS CONTACT AREA ..[illegible] SQ. IN.
OPERATOR .... DATE 11/14/78 SERIAL NR. ..[illegible]..........

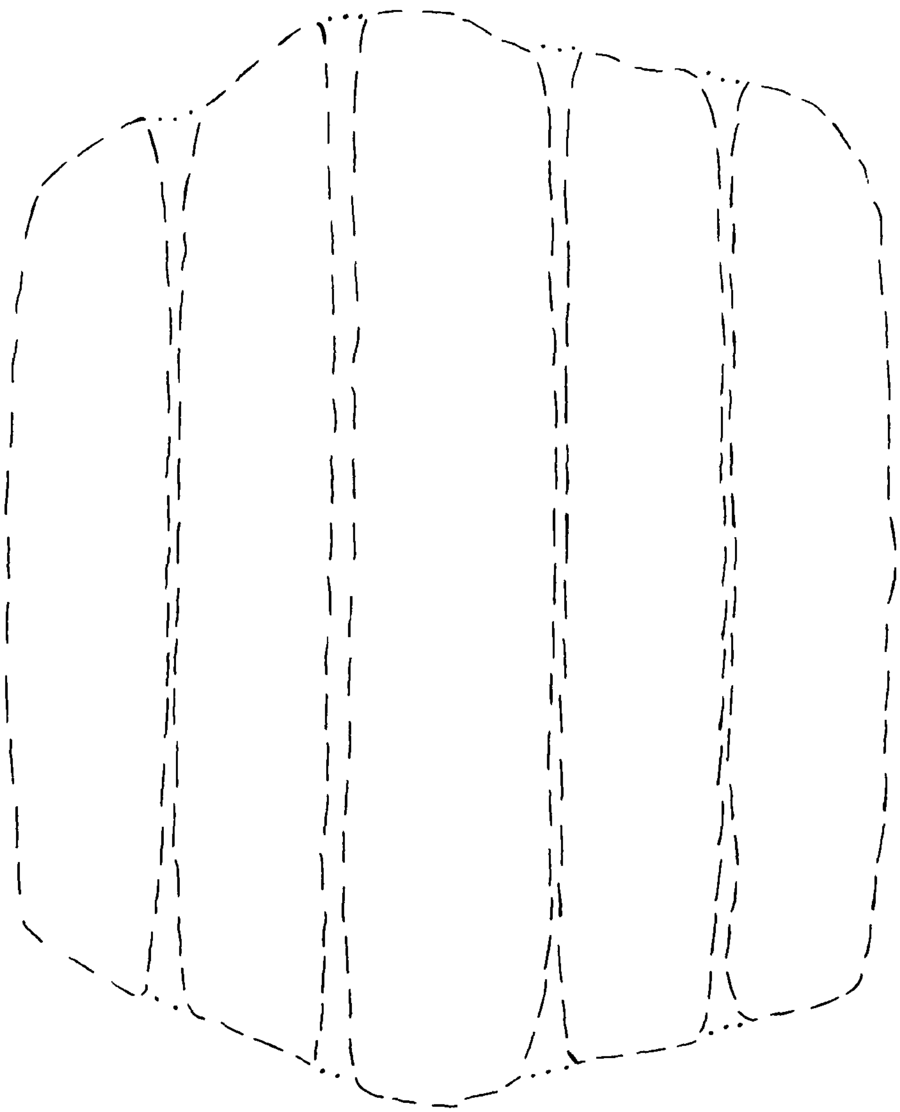


Figure C-33. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8.....CAST... MFR Zedron..
NEW ..X... USED .... RETREAD BY ....N/A.....................
S. O. NO. 77-21............ CODE NO. ..62....... FLPL .X... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.00... IN.
RATED INFLATION ..125........... PSI MAX. FOOTPRINT WDTH. .6.25... IN.
60 % RATED LOAD ......3990...... LBS. NET CONTACT AREA ....27.57SQ. IN.
19.24 DEFLECTION GROSS CONTACT AREA .....30.96SQ. IN.
OPERATOR .... DATE 11/14/78 SERIAL NR. ....3098P2........

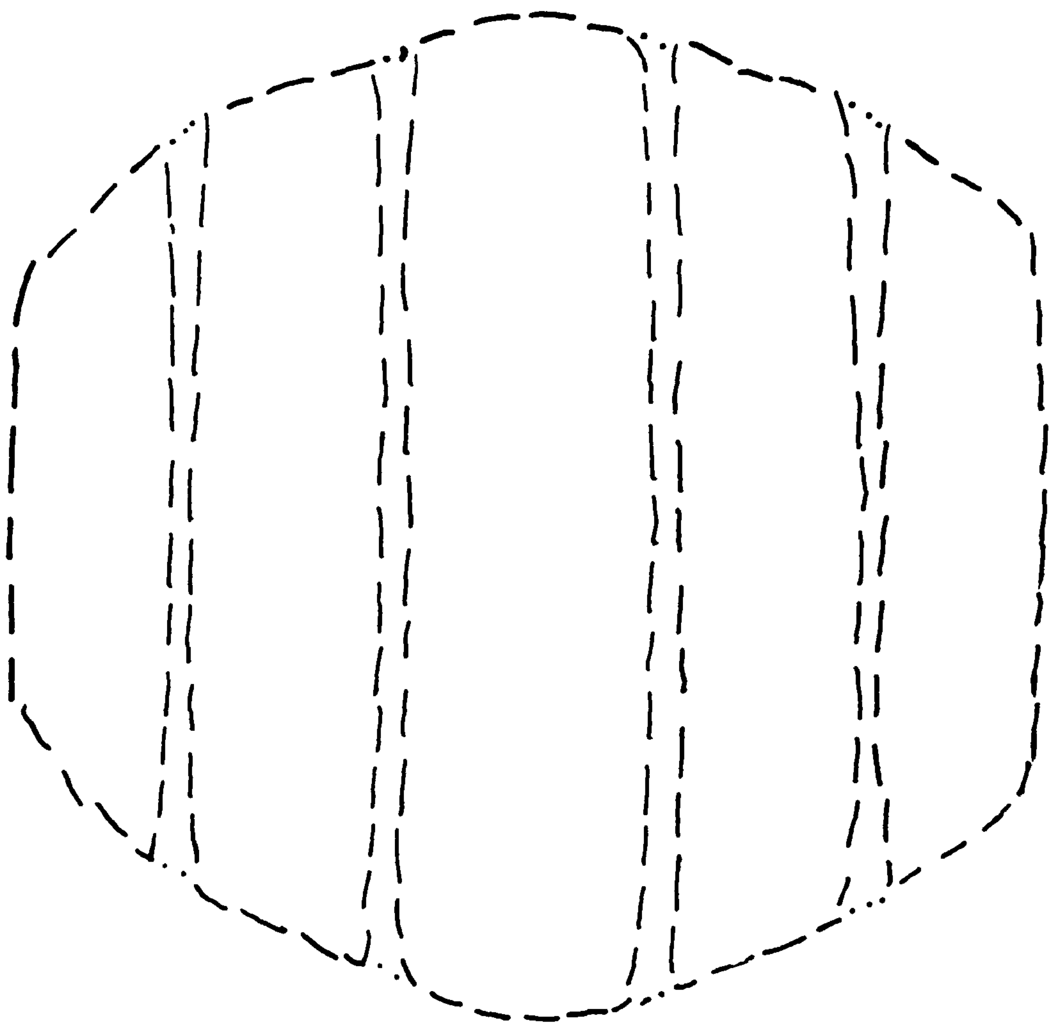


Figure C-34. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8 CAST MFR Zedron
NEW X USED RETREAD BY N/A
S. O. NO. 77-21 CODE NO. 68 FLPL X FLWHL
SKID DEPTH IN. MAX. FOOTPRINT LGTH. 7.0 IN.
RATED INFLATION 125 PSI MAX. FOOTPRINT WDTH. 6.375 IN.
100 % RATED LOAD 6650 LBS. NET CONTACT AREA 33.76 SQ. IN.
19.87 DEFLECTION GROSS CONTACT AREA 37.62 SQ. IN.
OPERATOR DATE 11/8/78 SERIAL NR. B09803

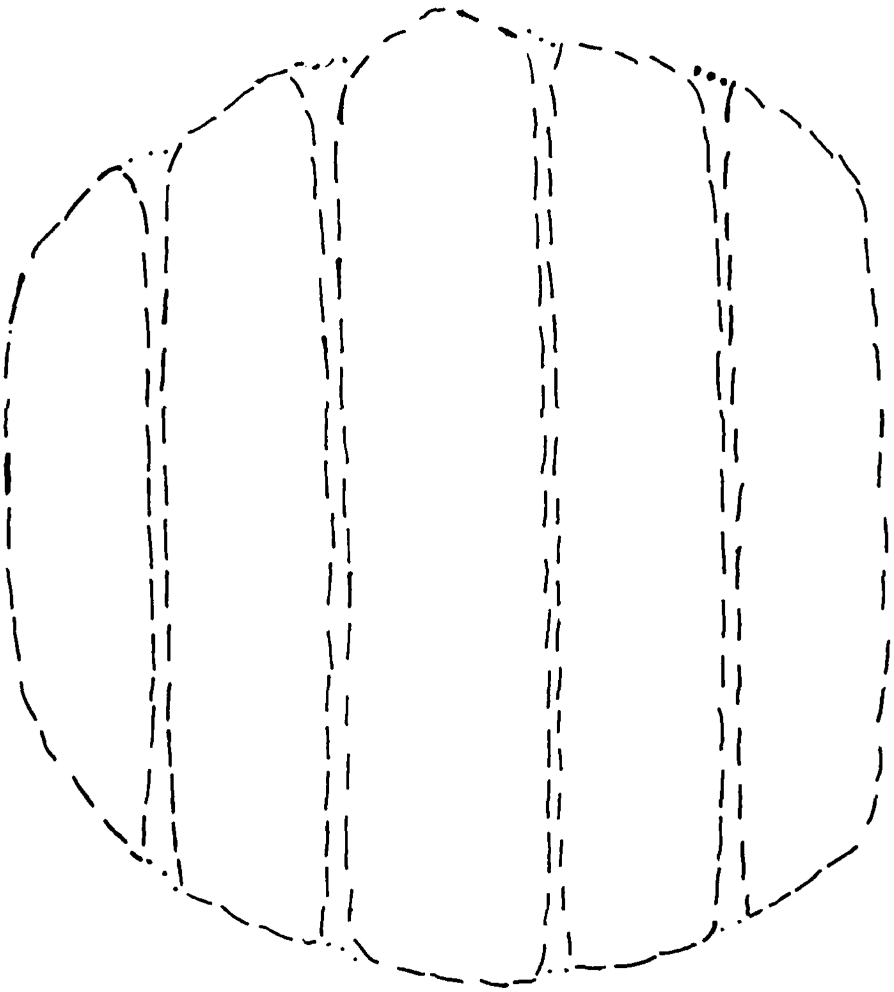


Figure C-35. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8 CAST .... MFR Zedron ..
NEW ... X .. USED .... RETREAD BY .... N/A ....
S. O. NO. ..... 77-21 .... CODE NO. ... 68 ...... FLPL .X... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 5.75 ... IN.
RATED INFLATION ..... 125 .... PSI MAX. FOOTPRINT WDTH. 5.75 ... IN.
.. 60 % RATED LOAD .. 3990 .... LBS. NET CONTACT AREA ... 22.56 SQ. IN.
13.71 DEFLECTION GROSS CONTACT AREA 25.69 SQ. IN.
OPERATOR .... DATE 11/8/78 SERIAL NR. B09803 ....

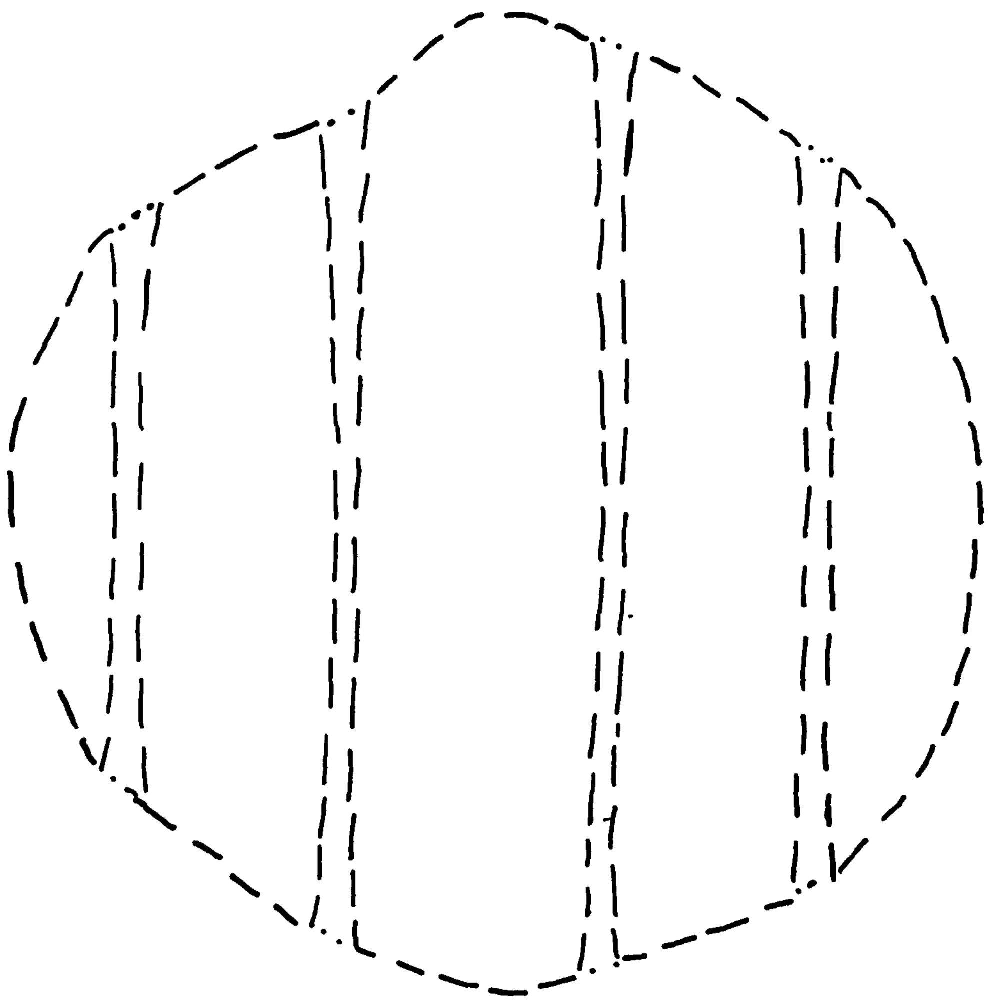


Figure C-36. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE .....7.00-8.....CAST.. MFR Zedron..
NEW ...X.. USED .... RETREAD BY N/A...............................
S. O. NO. .....77-21........ CODE NO. ....72..... FLPL .X... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .8.625.. IN.
RATED INFLATION ....125..... PSI MAX. FOOTPRINT WDTH. .6.625.. IN.
.100. % RATED LOAD ....6650...... LBS. NET CONTACT AREA ...44.12 SQ. IN.
.33.17 DEFLECTION GROSS CONTACT AREA ..48.58 SQ. IN.
OPERATOR .... DATE 11/17/78 SERIAL NR. .....B09882.......

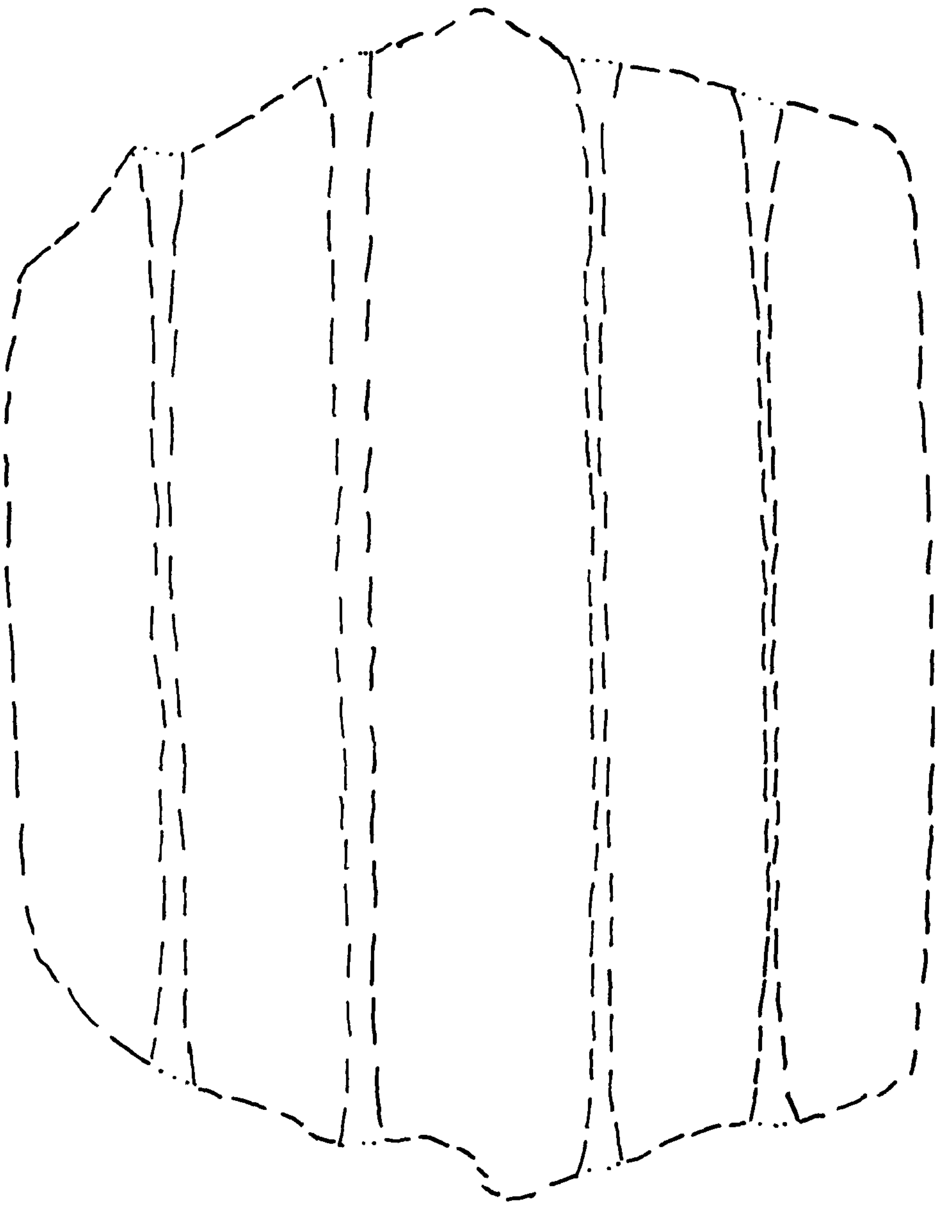


Figure C-37. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8.... CAST ..... MFR Zedron..
NEW ...X.. USED .... RETREAD BY ....N/A.........................
S. O. NO. ......77-21...... CODE NO. ...72..... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.875.. IN.
RATED INFLATION 125.............. PSI MAX. FOOTPRINT WDTH. .6.44... IN.
..60..% RATED LOAD ....3990. LBS. NET CONTACT AREA ...29.30 SQ. IN.
.21.20. DEFLECTION GROSS CONTACT AREA .34.26 SQ. IN.
OPERATOR .... DATE 11/17/78 SERIAL NR. ......B098R2.........

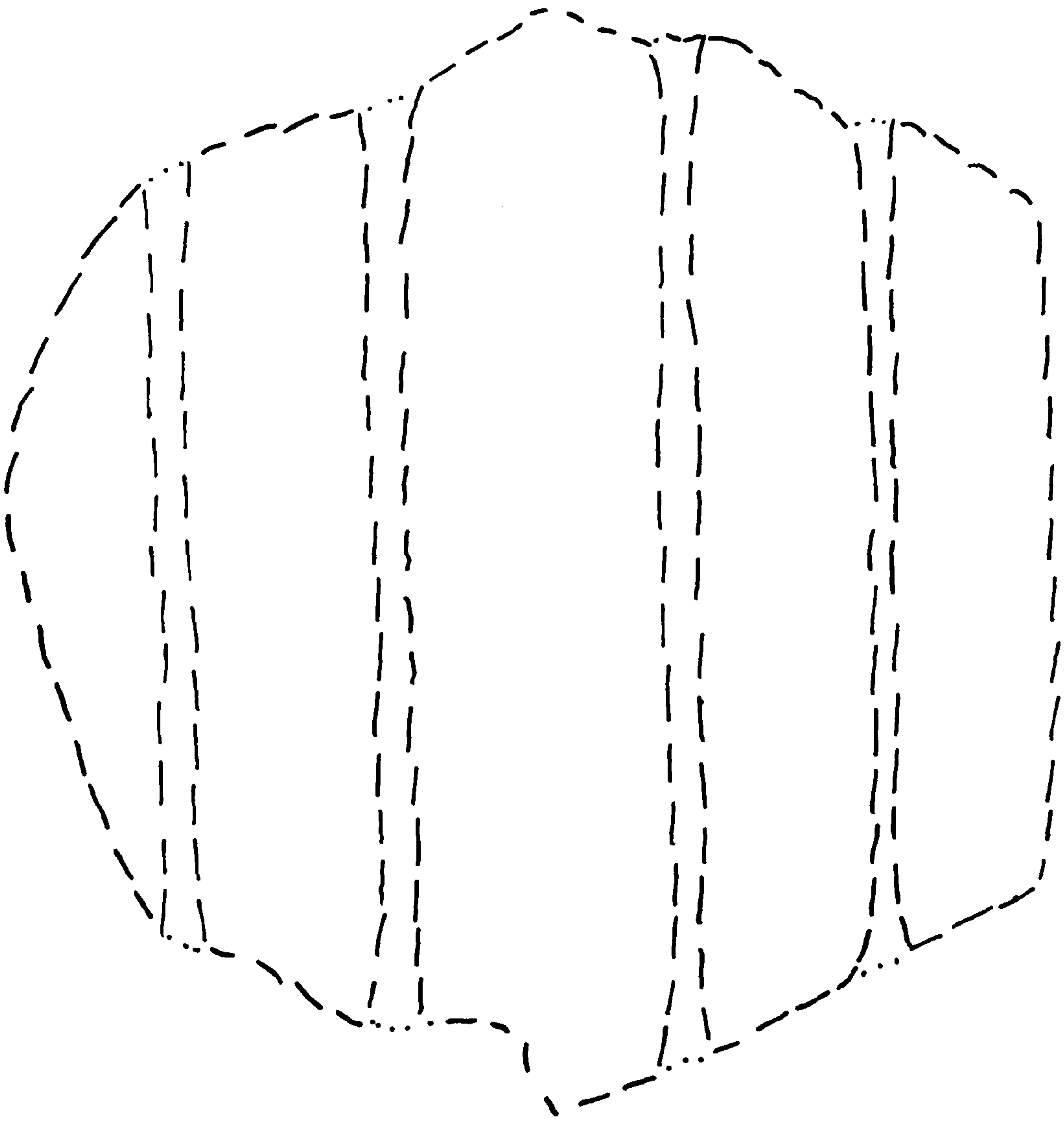


Figure C-38. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ......7.00-8.......... MFR Zedron..
NEW ....X. USED .... RETREAD BY ....N/A..........................
S. O. NO. ....77-21...... CODE NO. ....78..... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.750.. IN.
RATED INFLATION ......125...... PSI MAX. FOOTPRINT WDTH. .6.188.. IN.
.100 % RATED LOAD ..6650........ LBS. NET CONTACT AREA .31.12.. SQ. IN.
.19.42 DEFLECTION GROSS CONTACT AREA .34.46 SQ. IN.
OPERATOR .... DATE 2/28/78 SERIAL NR. ....B09853 ....

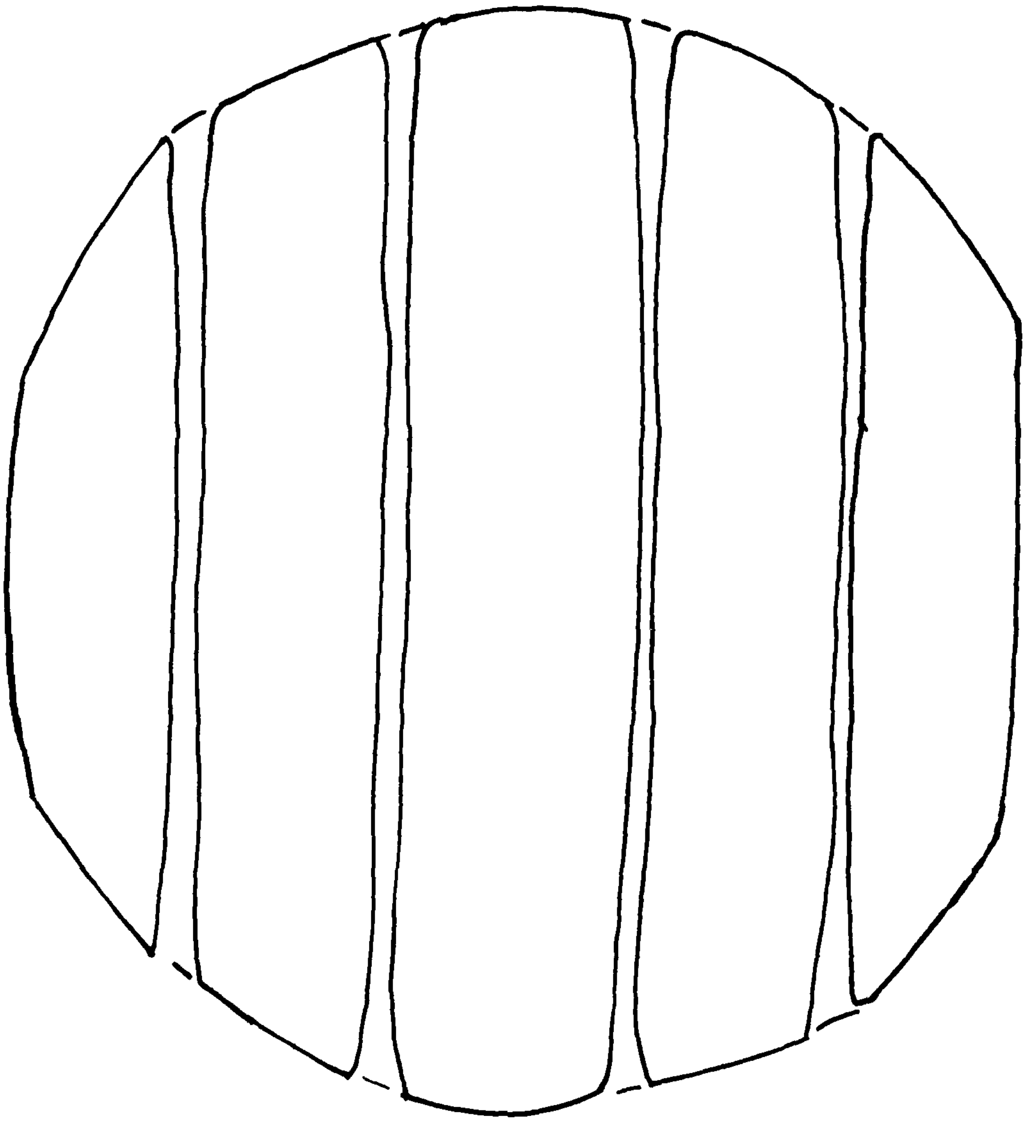


Figure C-39. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8.... MFR Zedron..
NEW ...X.. USED .... RETREAD BY ...N/A....
S. O. NO. ..77-21.......... CODE NO. ..78....... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .5.563.. IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. .5.344.. IN.
..60 % RATED LOAD ...3990...... LBS. NET CONTACT AREA ...20.82 SQ. IN.
13.66. DEFLECTION GROSS CONTACT AREA .23.43. SQ. IN.
OPERATOR .... DATE 2/28/79 SERIAL NR. ...B09853.........

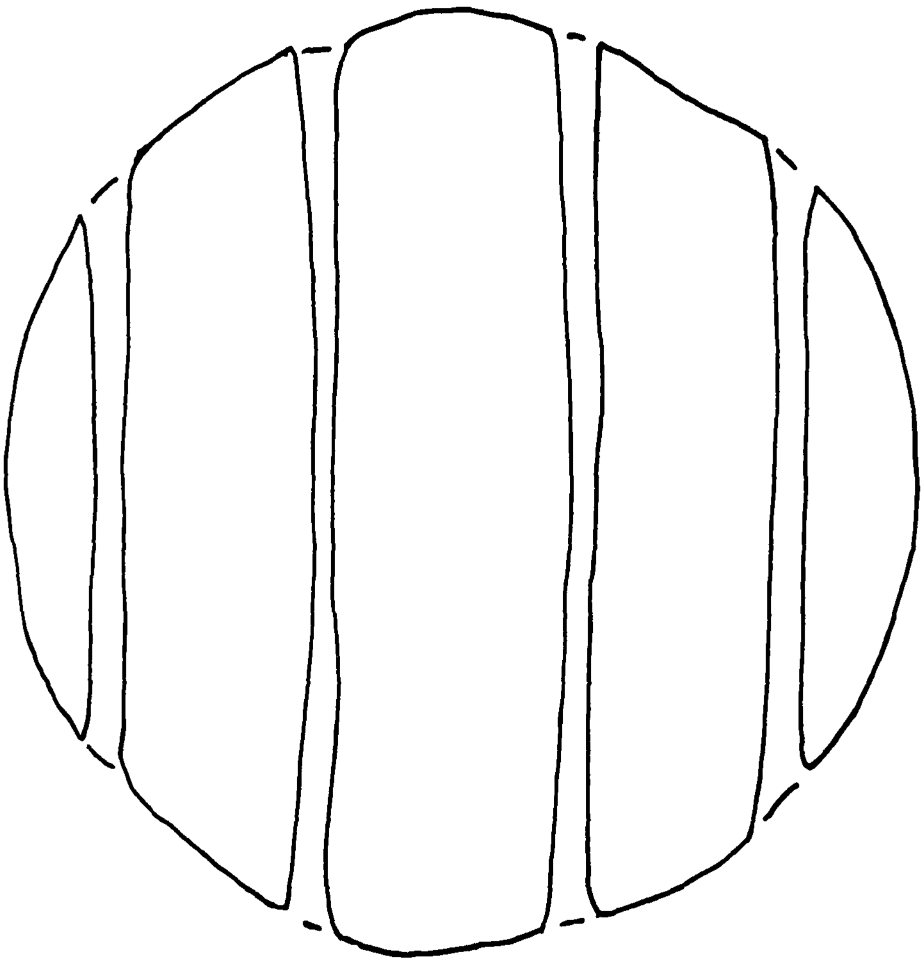


Figure C-40. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE 7.00-8 MFR Zedron
NEW X USED RETREAD BY N/A
S. O. NO. 77-21 CODE NO. 82 FLPL X FLWHL
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 6 5/8 IN.
RATED INFLATION 125 PSI MAX. FOOTPRINT WDTH. 6 3/16 IN.
100 % RATED LOAD 6650 LBS. NET CONTACT AREA 30.49 SQ. IN.
18.46 DEFLECTION GROSS CONTACT AREA 33.30 SQ. IN.
OPERATOR .... DATE 11/17/78 SERIAL NR. B098T2

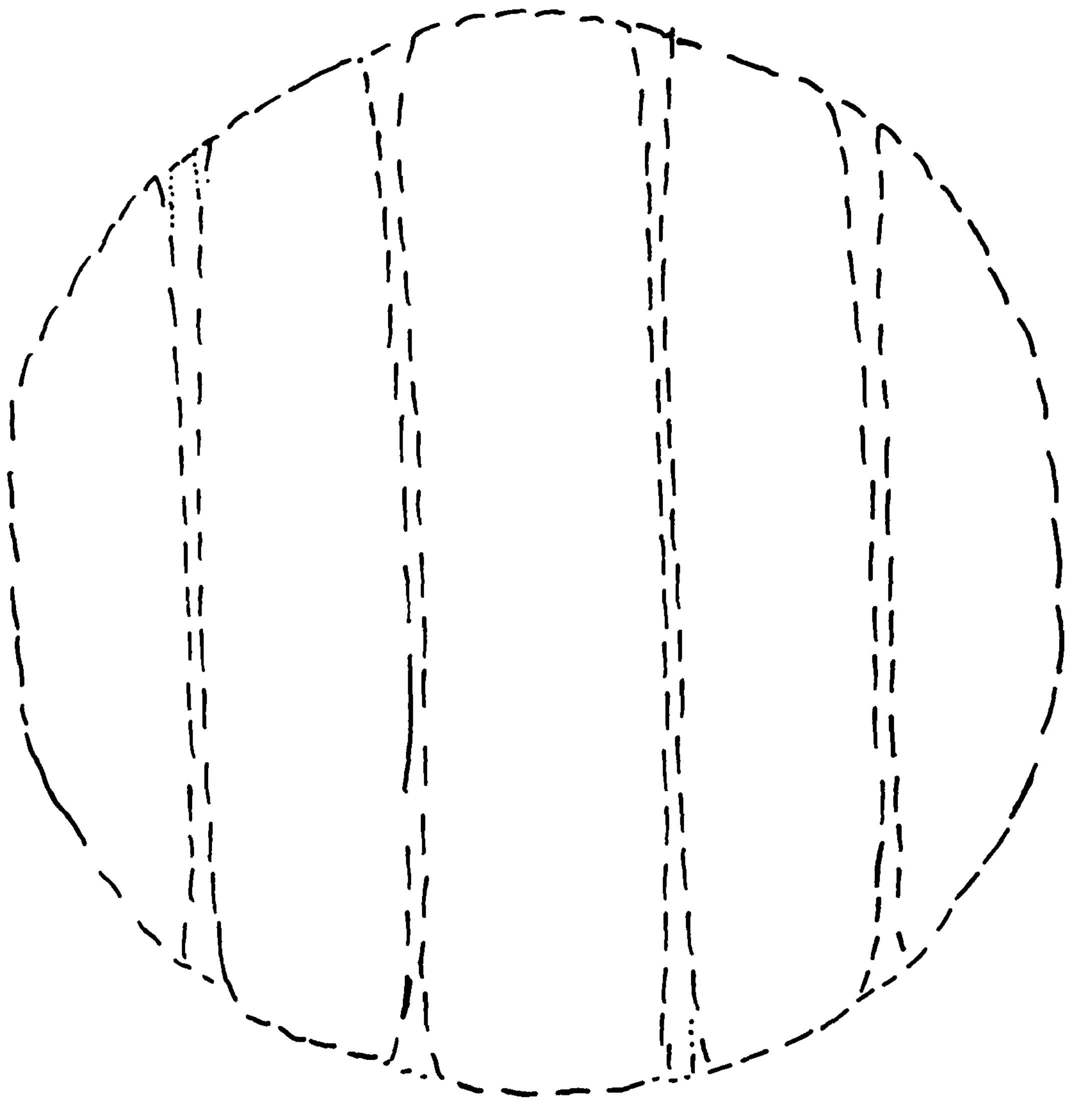


Figure C-41. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE .....7.00-8.............. MFR Zedron..
NEW ...X.. USED .... RETREAD BY ....N/A........................
S. O. NO. ..77-21.......... CODE NO. ....82.. FLPL .X... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .5 3/16.. IN.
RATED INFLATION 125............ PSI MAX. FOOTPRINT WDTH. .5 1/4.. IN.
..60. % RATED LOAD .3990........ LBS. NET CONTACT AREA ..19.42.. SQ. IN.
.12.75. DEFLECTION GROSS CONTACT AREA 22.18. SQ. IN.
OPERATOR .... DATE 11/17/78 SERIAL NR. ..B09812..........

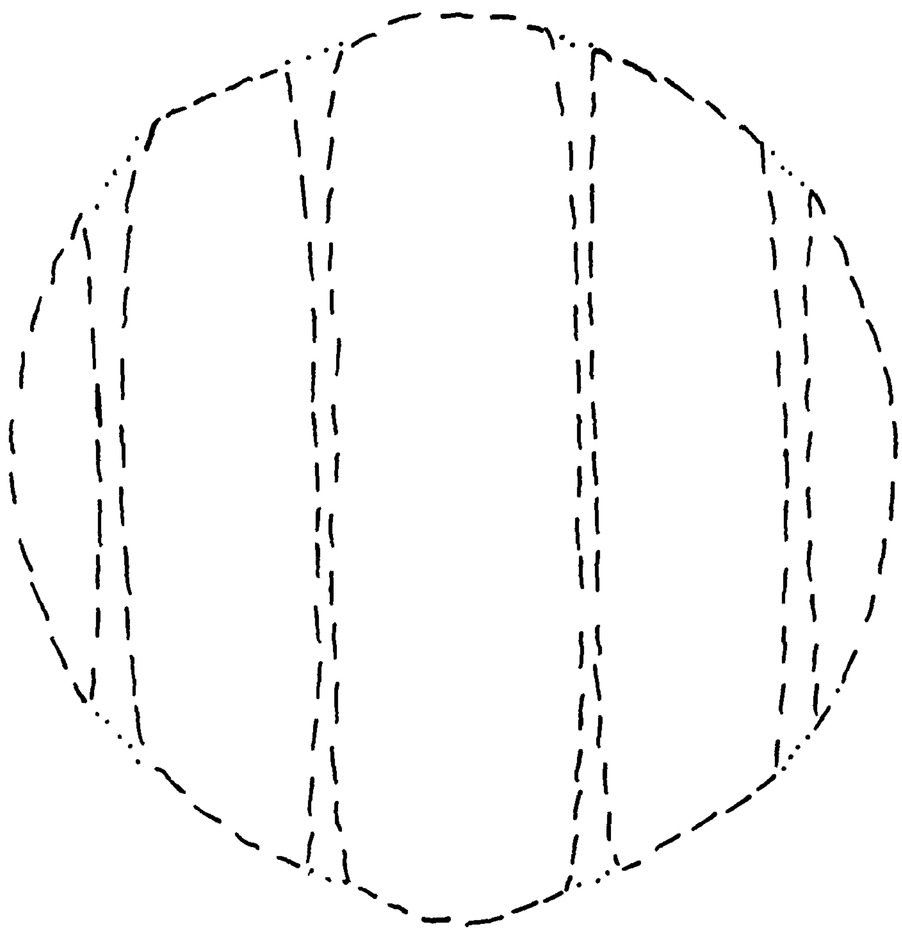


Figure C-42. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8........ MFR Zedron..
NEW ..X... USED .... RETREAD BY ......N/A..........................
S. O. NO. ...77-21.......... CODE NO. .....88.... FLPL ..X. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .7.750.. IN.
RATED INFLATION ....125..... PSI MAX. FOOTPRINT WDTH. .6.375.. IN.
.100. % RATED LOAD ....6650..... LBS. NET CONTACT AREA ...38.77 SQ. IN.
.25.90. DEFLECTION GROSS CONTACT AREA .43.04 SQ. IN.
OPERATOR .... DATE 7/23/79 SERIAL NR. .B128V3..........

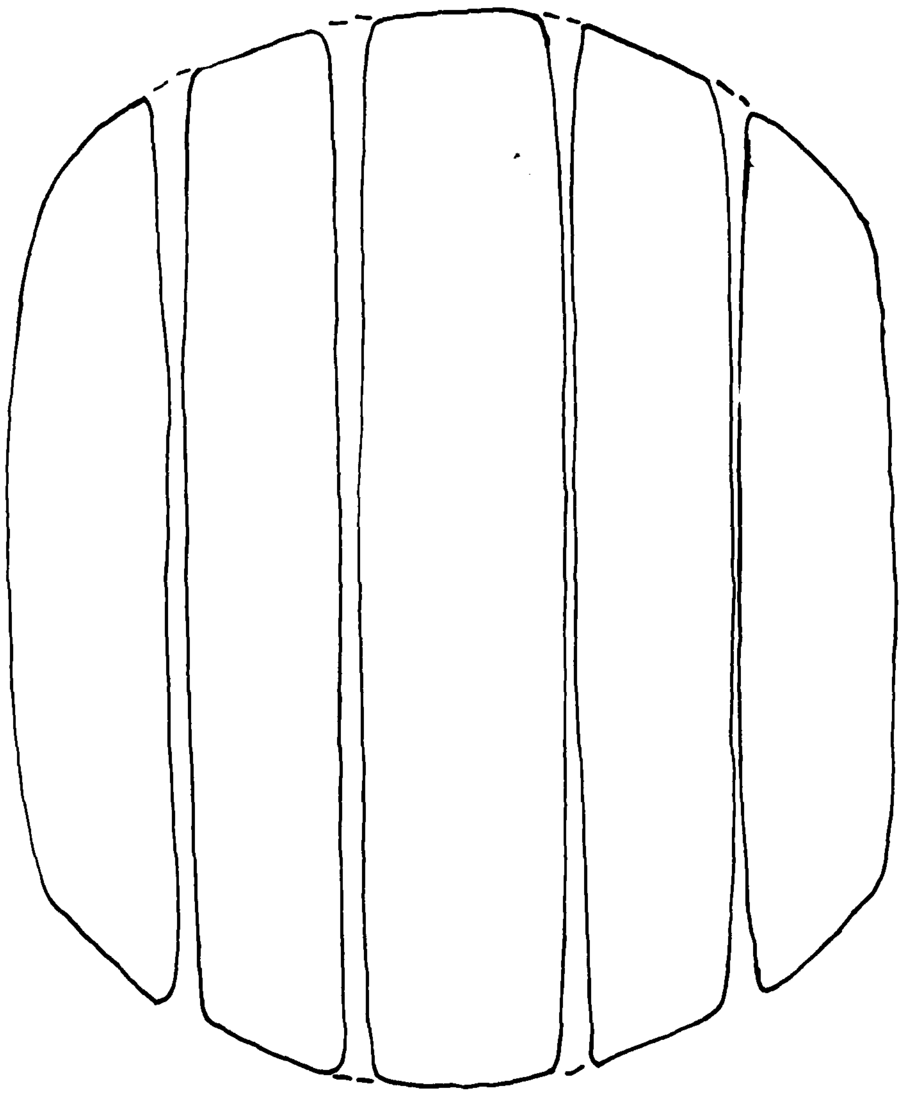


Figure C-43. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: [illegible] TIRE SIZE [illegible]
[illegible] USED [illegible] PREPARED BY [illegible]
[illegible] NO. [illegible]
[illegible] .... IN. MAX. FOOTPRINT LENGTH [illegible]
RATED INFLATION ......145...... PSI MAX. FOOTPRINT WIDTH [illegible]
[illegible] RATED LOAD [illegible] LBS. NET CONTACT AREA [illegible]
[illegible] DEFLECTION [illegible] GROSS CONTACT AREA [illegible]
OPERATOR .... DATE [illegible] SERIAL NO. [illegible]

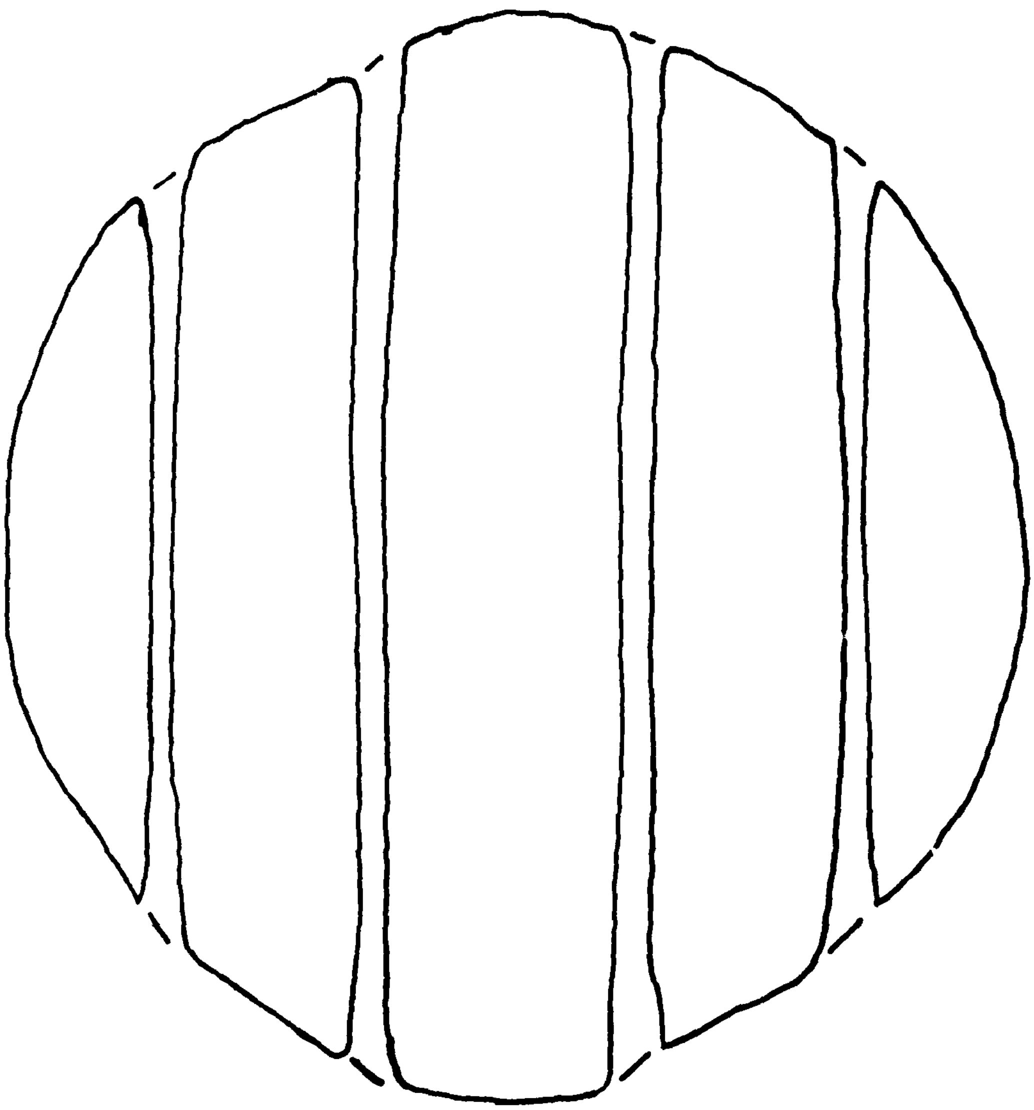
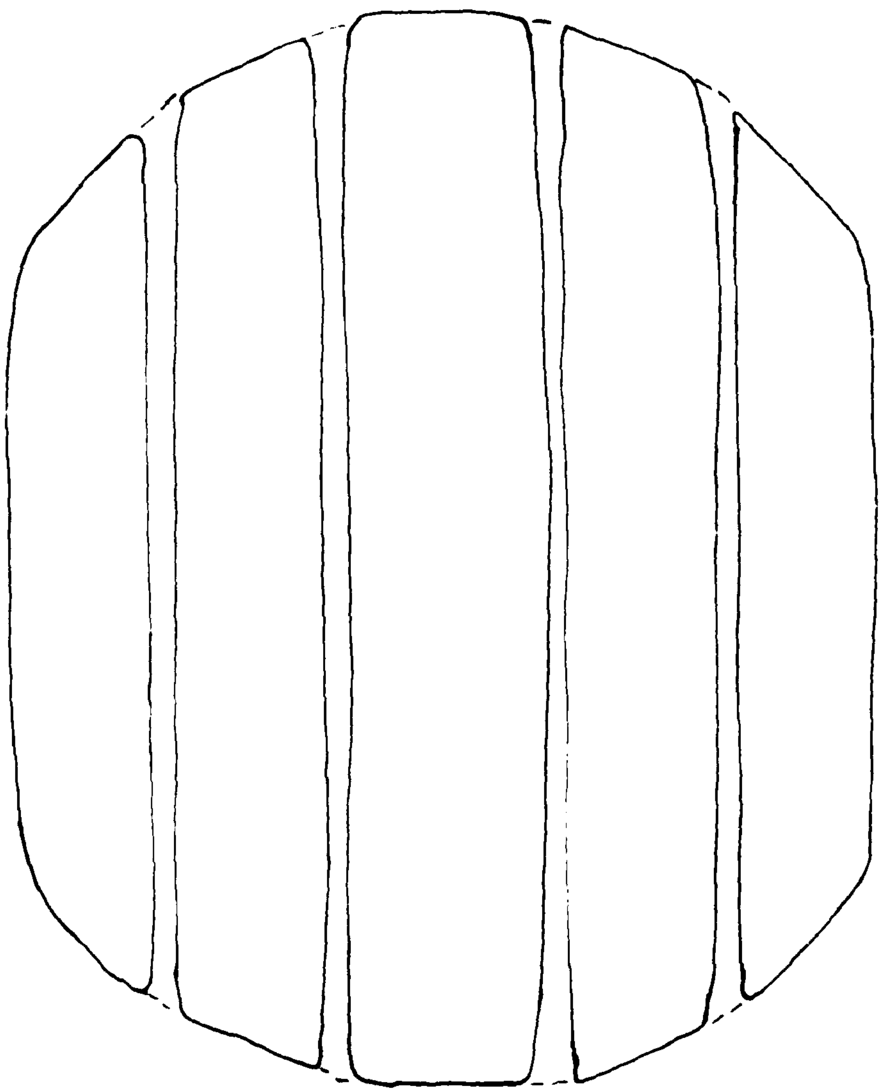


Figure C-44. Tire Contact Prints (Footprints)

[illegible]	TIRE SIZE .... [illegible]	MFR [illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible] .... IN.	MAX. FOOTPRINT LGTH.	[illegible] IN.
[illegible] .... IN.	MAX. FOOTPRINT WIDTH	[illegible] IN.
[illegible] .... [illegible]	NET CONTACT AREA	[illegible] SQ. IN.
[illegible]	GROSS CONTACT AREA	[illegible] SQ. IN.
[illegible] DATE	[illegible] NO.	[illegible]



TEST TIRE FOOTPRINT: TIRE SIZE 7:00-8 ... MFR Zedron
NEW ..X.. USED .... RETREAD BY ... N/A ...
S. O. NO. ....77-21........ CODE NO. ....91..... FLPL ...X. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 6.313 ... IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. 5.688 .... IN.
..60.. % RATED LOAD .3990......... LBS. NET CONTACT AREA ..24.28. SQ. IN.
15.16 DEFLECTION GROSS CONTACT AREA 28.85 SQ. IN.
OPERATOR .... DATE 2/22/79 SERIAL NR. ......B128v3.......

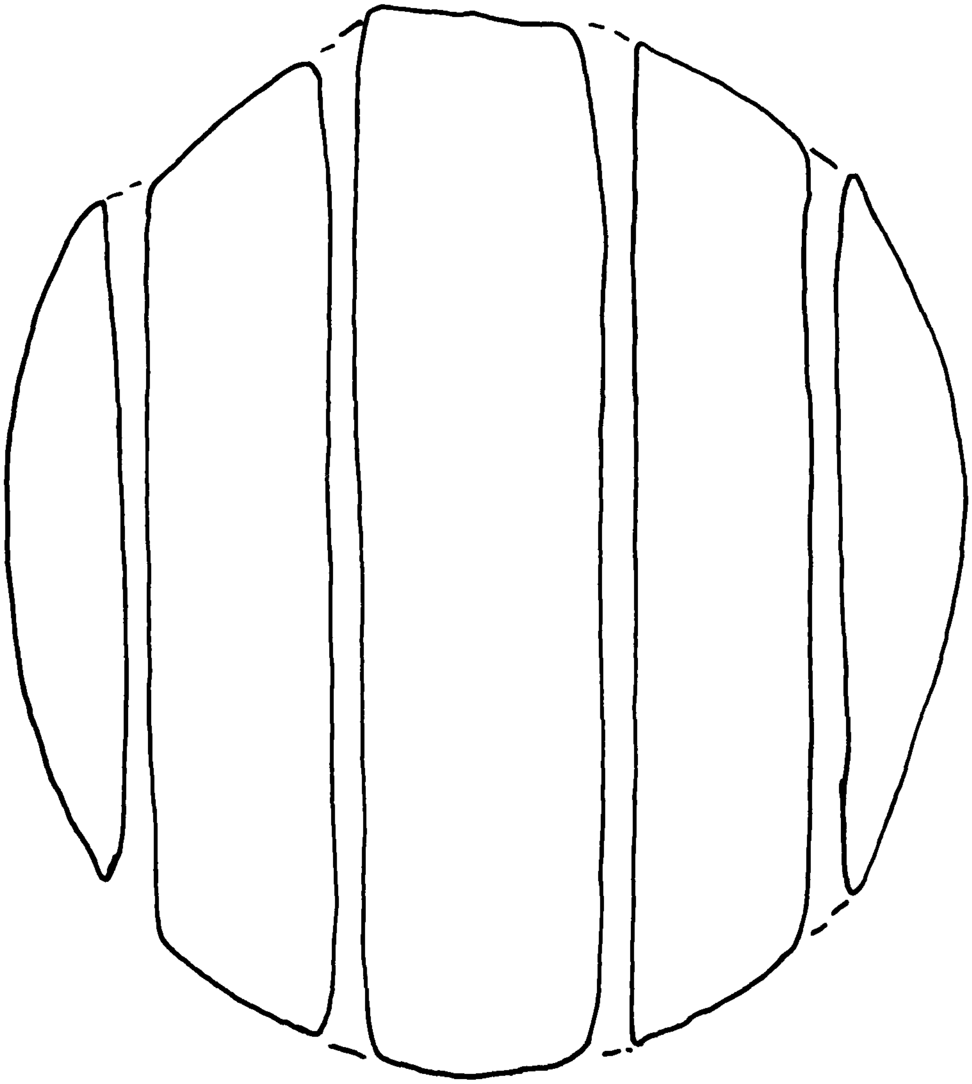


Figure C-46. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8............. MFR Zedrer..
NEW X...... USED .... RETREAD BY ....N/A...............................
S. O. NO. ......77-21......... CODE NO. ....94....... FLPL ..X... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..7.500.. IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. ..6.313.. IN.
100 % RATED LOAD ....6650......... LBS. NET CONTACT AREA ....36.91 SQ. IN.
23.56. DEFLECTION GROSS CONTACT AREA ..39.86 SQ. IN.
OPERATOR .... DATE 3/21/79 SERIAL NR. ...932993........

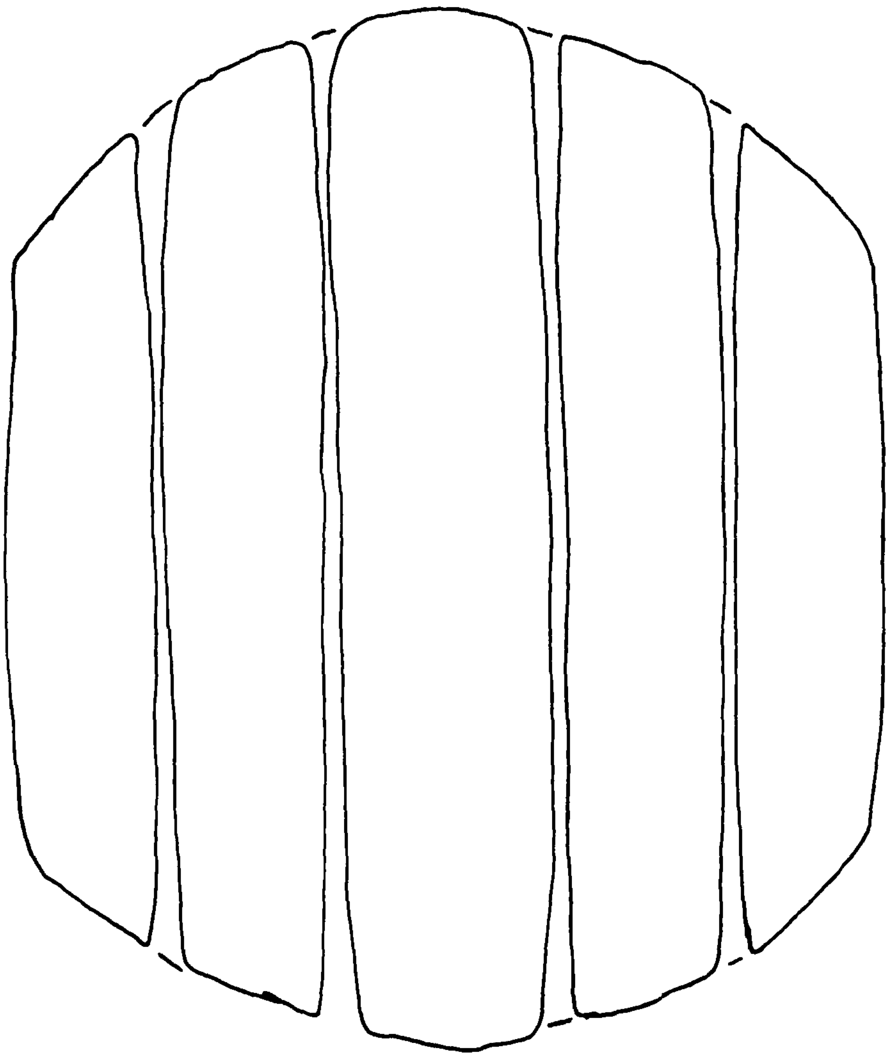


Figure C-47. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ...7.00-8............... MFR Zedron..
NEW ..X... USED .... RETREAD BY ....N/A..........................
S. O. NO. .....77-21........ CODE NO. ....94....... FLPL ..X . FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..6.00... IN.
RATED INFLATION ....125...... PSI MAX. FOOTPRINT WDTH. ..6.00... IN
.60.. % RATED LOAD .....3990....... LBS. NET CONTACT AREA ...24.10 SQ. IN.
15.69.. DEFLECTION GROSS CONTACT AREA ..27.10 SQ. IN.
OPERATOR ... . DATE 3/21/79 SERIAL NR. ....B02983..........

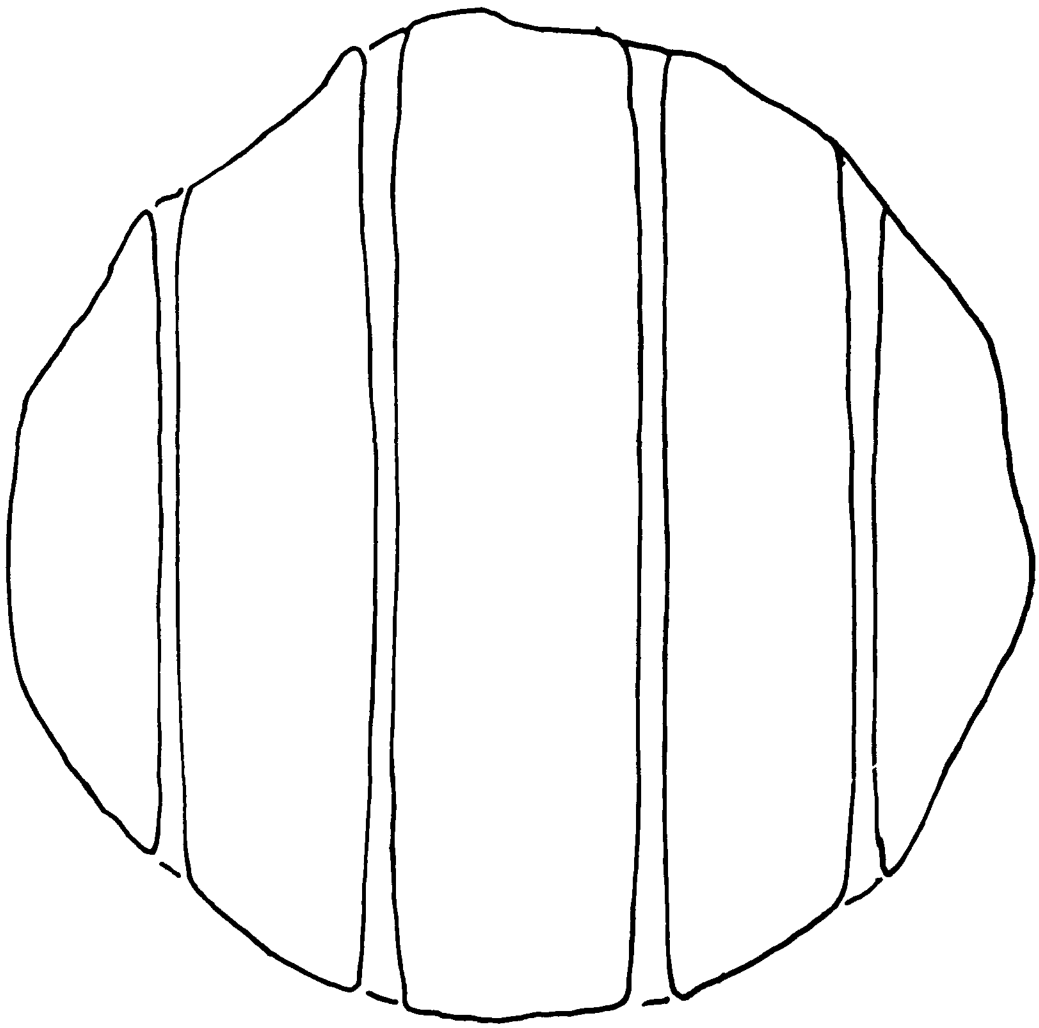


Figure C-48. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8......... MFR [illegible]..
NEW ...... USED .... RETREAD BY ....N/A.......................
S. O. NO. ..[illegible].......... CODE NO. ....97...... FLPL .8... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .7.375.. IN.
RATED INFLATION ....[illegible]........ PSI MAX. FOOTPRINT WDTH .6.313.. IN
100% RATED LOAD 6650.......... LBS. NET CONTACT AREA ...35.91 SQ. IN.
[illegible] DEFLECTION GROSS CONTACT AREA .39.42 SQ. IN
OPERATOR .... DATE 3/21/79 SERIAL NR. ..B02933..........

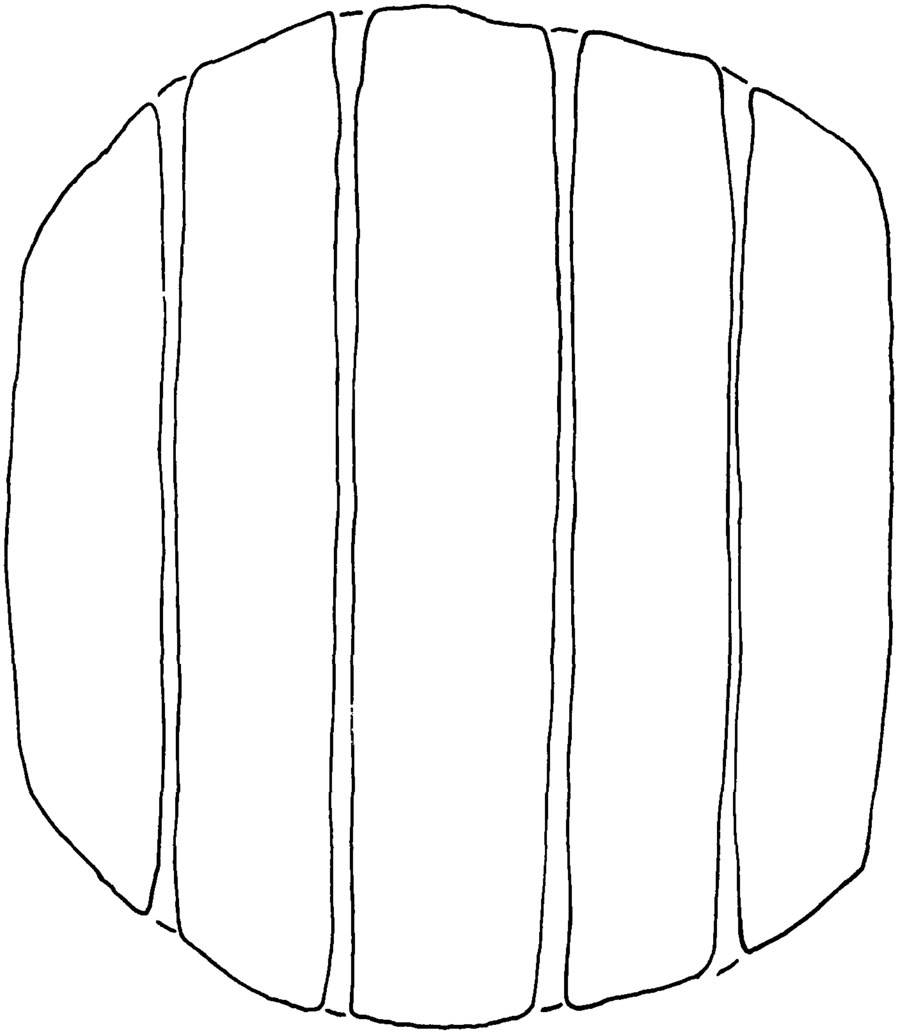


Figure C-49. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE .....7.00-8........... MFR Zedron..
NEW ..X... USED .... RETREAD BY ....N/A..........................
S. O. NO. .77-21........... CODE NO. ....97..... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.063.. IN.
RATED INFLATION ....125....... PSI MAX. FOOTPRINT WDTH. .6.00... IN.
.60.. % RATED LOAD ..3990....... LBS. NET CONTACT AREA ...24.02 SQ. IN.
15.65.. DEFLECTION GROSS CONTACT AREA .28.09 SQ. IN.
OPERATOR .... DATE 3/21/79 SERIAL NR. ....B02983...

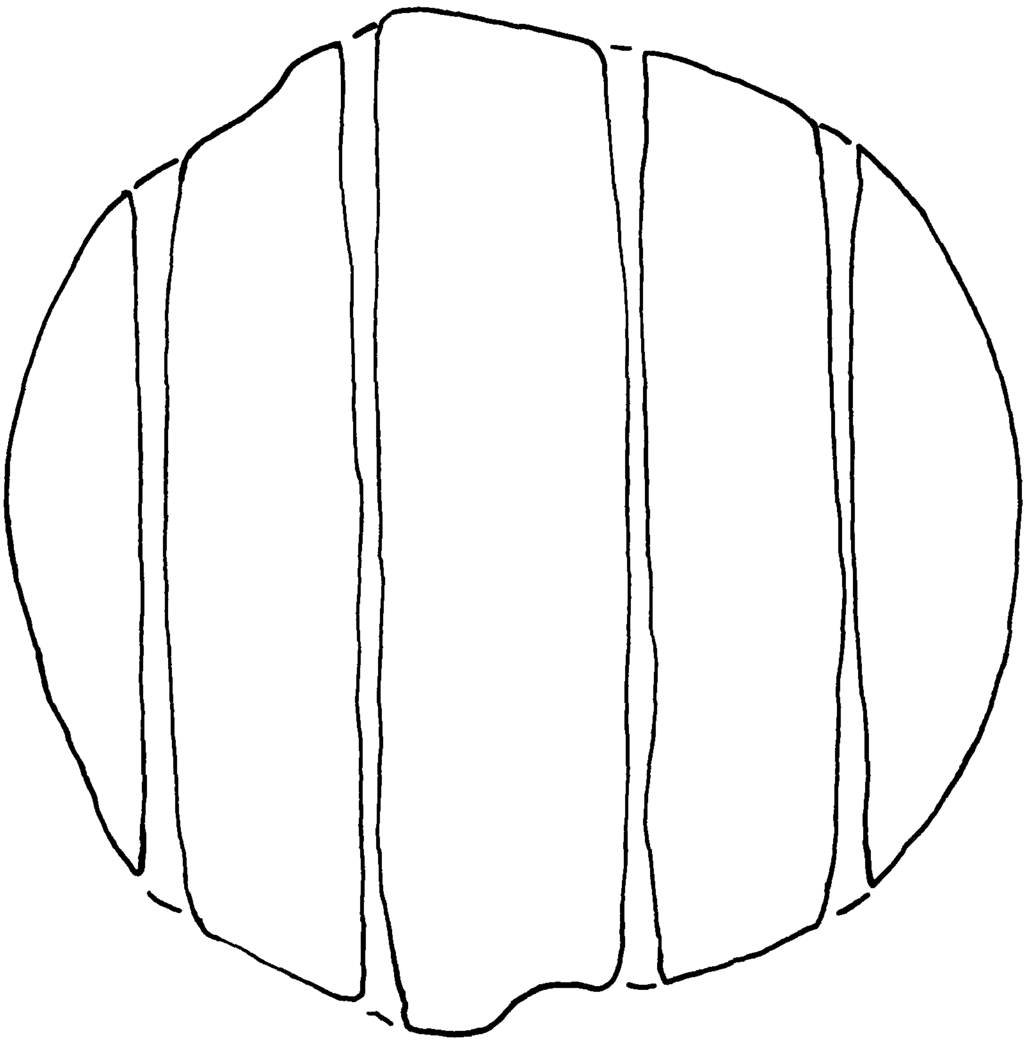


Figure C-50. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ......7.00-8.............. MFR Zedron........

NEW ..X... USED .... RETREAD BY ....N/A......................

S. O. NO. ....77-21..... CODE NO. ..100..... FLPL ...X. FLWHL .....

SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .7.016.. IN.

RATED INFLATION ..125.......... PSI MAX. FOOTPRINT WDTH. .6.297... IN.

.100 % RATED LOAD ....6650. LBS. NET CONTACT AREA ...35.88 SQ. IN.

.23.26 DEFLECTION GROSS CONTACT AREA .38.56 SQ. IN.

OPERATOR .... DATE 3/22/79 SERIAL NR. B029Y3...........

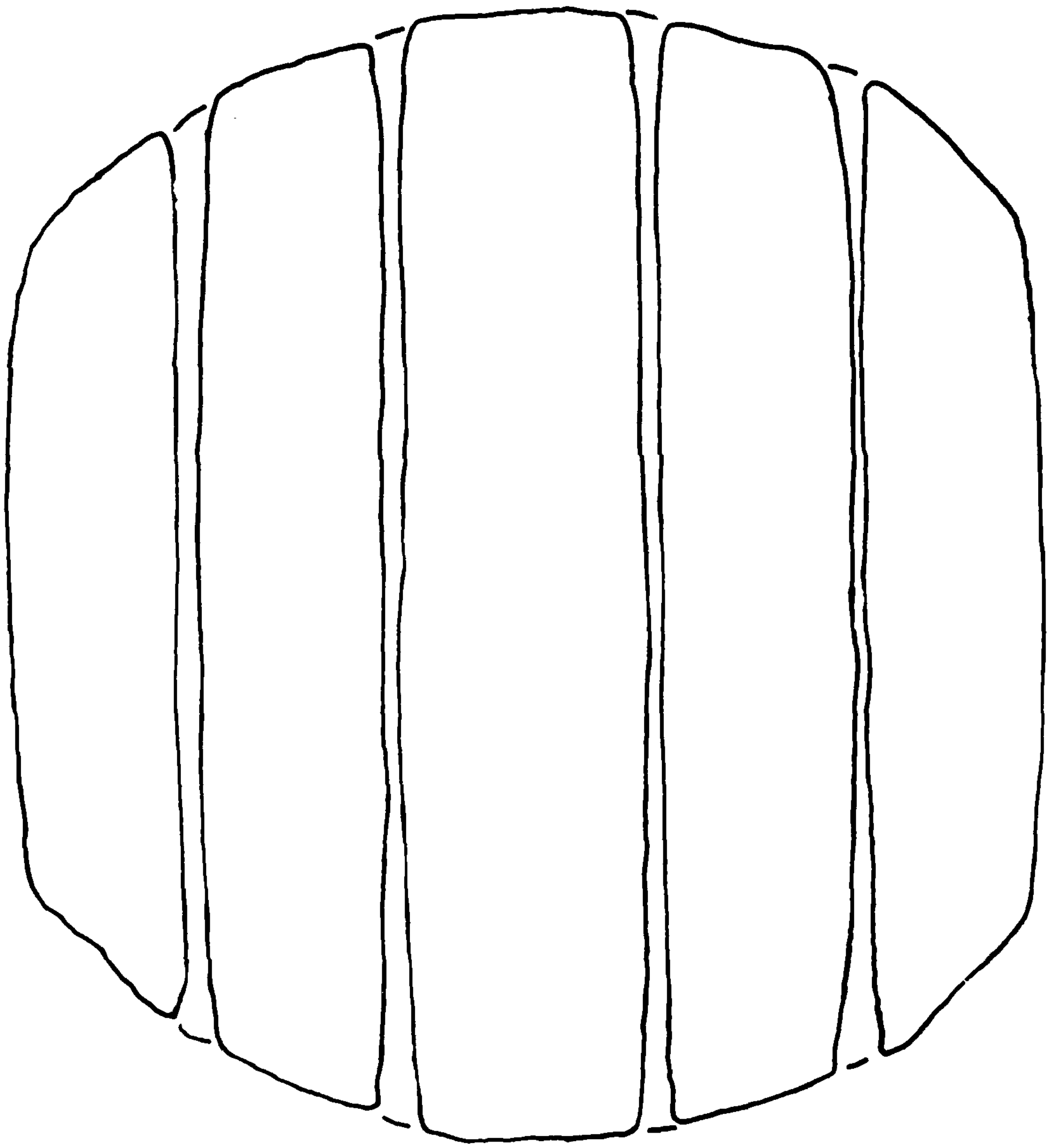


Figure C-51. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8............ MFR Zedron..
NEW .X.... USED .... RETREAD BY .....N/A.........................
S. O. NO. ....77-21...... CODE NO. ..100...... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .5.906.. IN.
RATED INFLATION ....125......... PSI MAX. FOOTPRINT WDTH. .6.000.. IN.
..60 % RATED LOAD ......3990.... LBS. NET CONTACT AREA ...24.90 SQ. IN.
.15.56 DEFLECTION GROSS CONTACT AREA ..27.46 SQ. IN.
OPERATOR .... DATE 3/22/79 SERIAL NR. ....[illegible].....

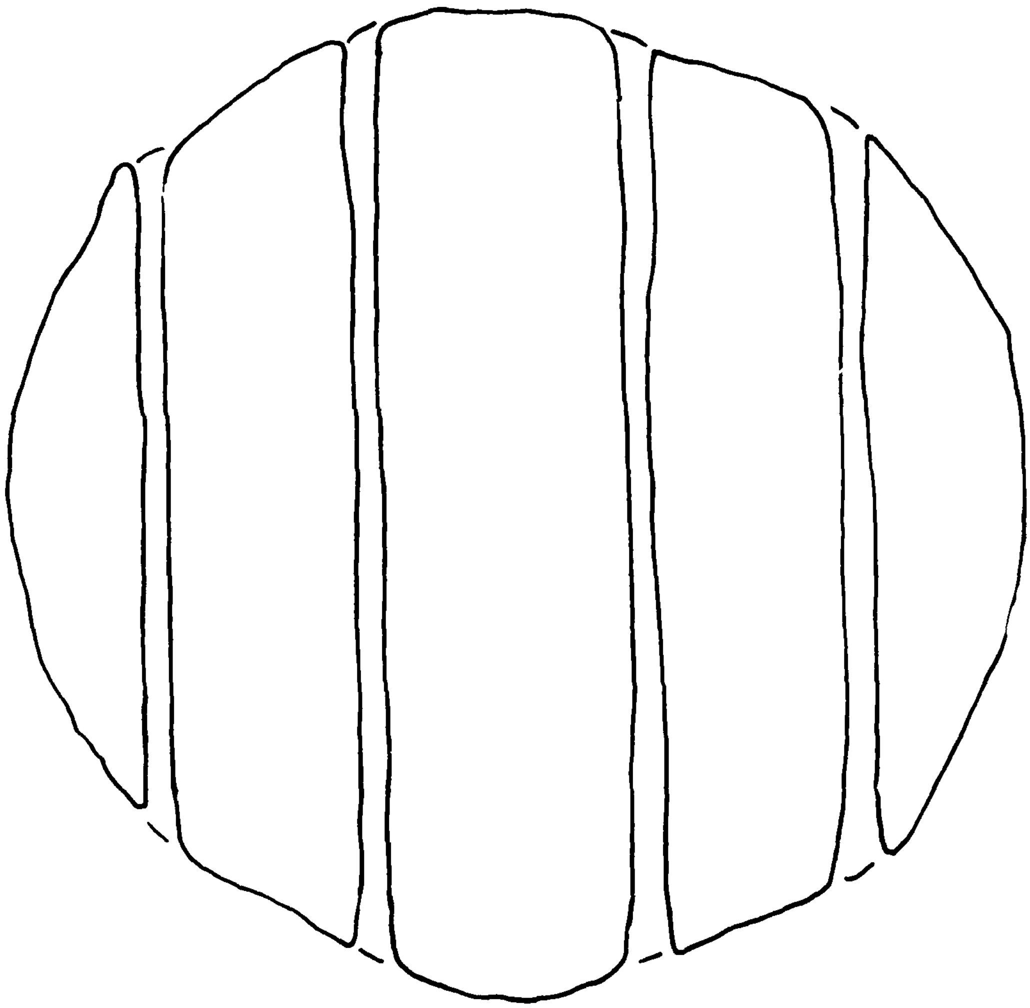


Figure C-52. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8.......... MFR Zedron..
NEW ..X.... USED .... RETREAD BY ....N/A..........
S. O. NO. ....77-31.......... CODE NO. ....103.... FTPL ..... FTWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..7.781.. IN.
RATED INFLATION ......125...... PSI MAX. FOOTPRINT WDTH. ..6.281.. IN.
100 % RATED LOAD ......6650...... LBS. NET CONTACT AREA ....40.15 SQ. IN.
24.91 DEFLECTION GROSS CONTACT AREA ....42.30 SQ. IN.
OPERATOR .... DATE 3/22/79 SERIAL NR. ..B02923..........

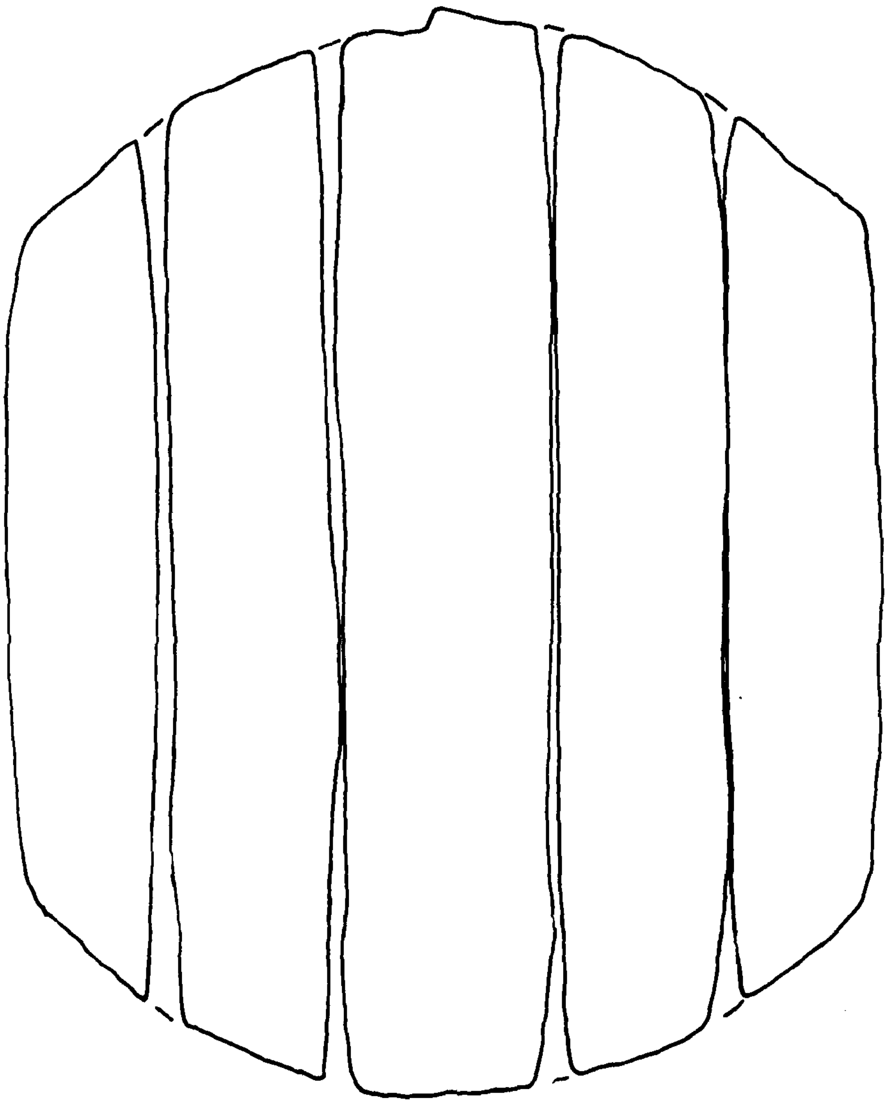


Figure C-53. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8........ MFR Zedron........
NEW ..X... USED .... RETREAD BY ....N/A..........................
S. O. NO. ....77-21...... CODE NO. ....103.... FLPL X.... FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.500.. IN.
RATED INFLATION ......125..... PSI MAX. FOOTPRINT WDTH. .5.859.. IN.
..60. % RATED LOAD ....3990...... LBS. NET CONTACT AREA ...26.82 SQ. IN.
.16.55. DEFLECTION GROSS CONTACT AREA ...29.73 SQ. IN.
OPERATOR .... DATE 3/22/79 SERIAL NR. ......B02923.........

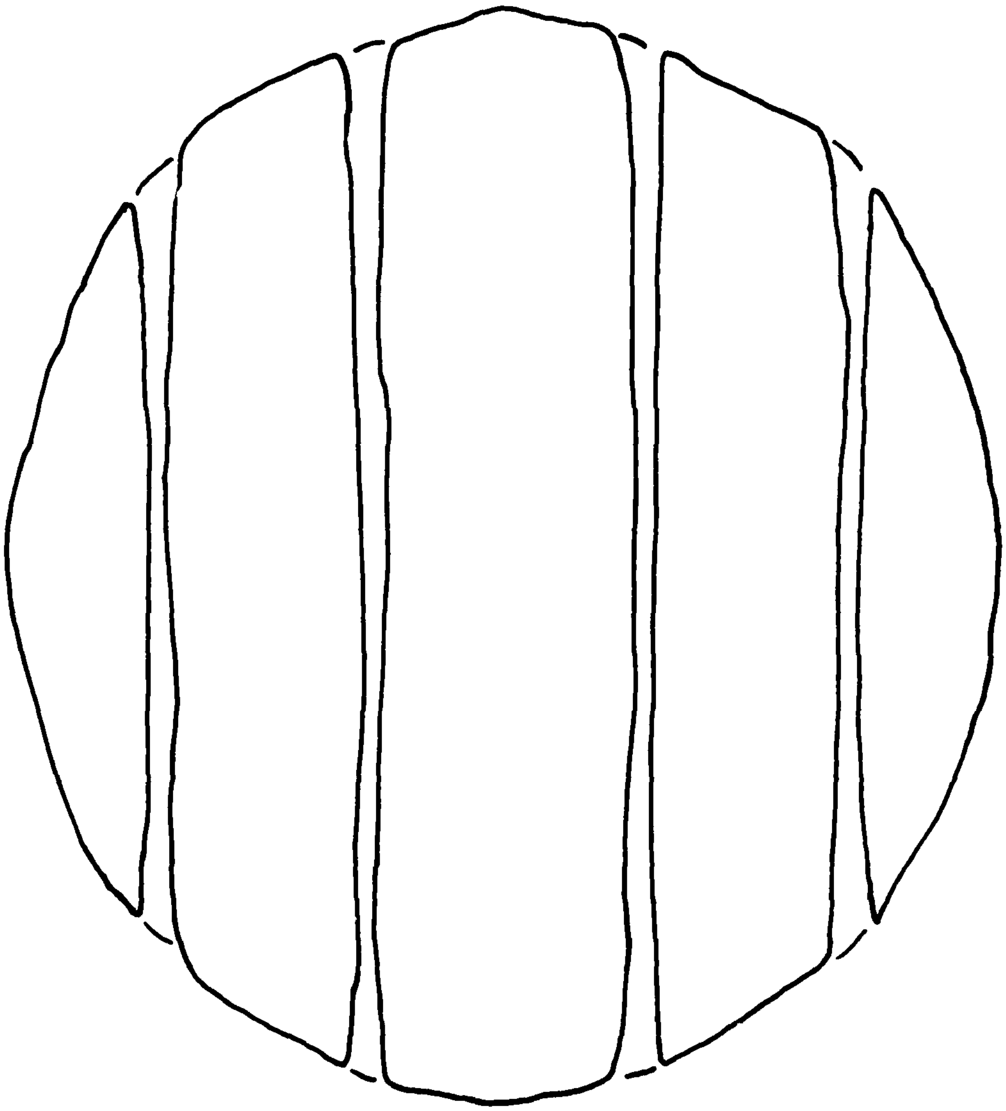


Figure C-54. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8...... MFR [illegible]
NEW ...X... USED .... RETREADED ....N/A......................
S. O. NO. ....[illegible]...... CODE NO. ......106.. TYPE .V... [illegible] .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. ..[illegible].. IN.
RATED INFLATION .....125......... PSI MAX. FOOTPRINT WDTH. ..[illegible].. IN.
[illegible] RATED LOAD [illegible].......... LBS. NET CONTACT AREA ...[illegible] SQ. IN.
[illegible] DEFLECTION GROSS CONTACT AREA [illegible] SQ. IN.
OPERATOR .... DATE [illegible] SERIAL NO. .....[illegible]......

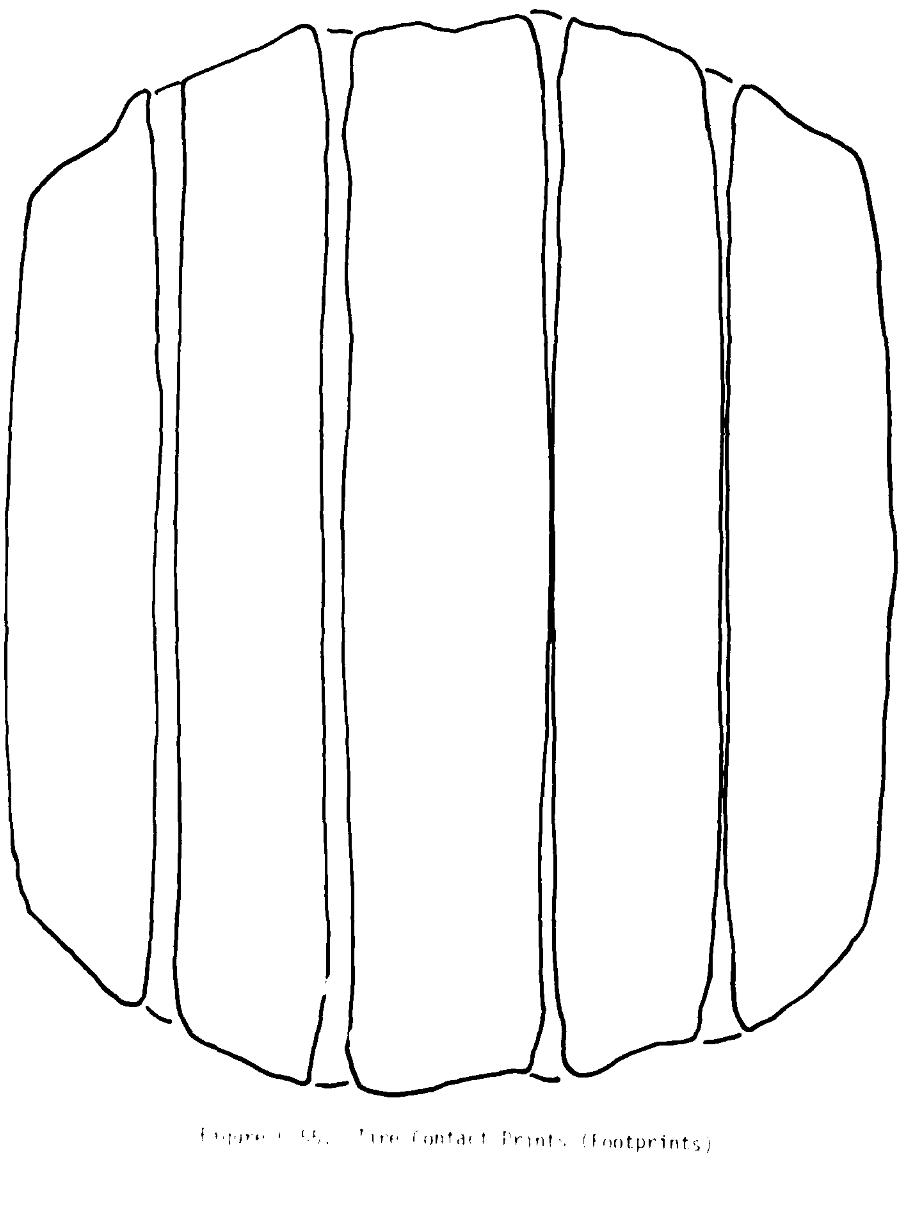


Figure C-55. Tire Contact Prints (Footprints)

TEST TYPE FOOTPRINT: TIRE SIZE ....7.00-8.......... MFR Zedron..
NEW ...X... USED .... RETREAD BY ...N/A.........................
W. O. NO. ... .77-21.. CODE NO. ....106.... FLPL ..X.. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.156.. IN.
RATED INFLATION ....125........ PSI MAX. FOOTPRINT WDTH. .6.125.. IN.
... % RATED LOAD ..3990.......... LBS. NET CONTACT AREA ...28.50 SQ. IN.
..... DEFLECTION GROSS CONTACT AREA .30.81 SQ. IN.
OPERATOR .... DATE 3/19/79 SERIAL NR. ......B029AA3.......

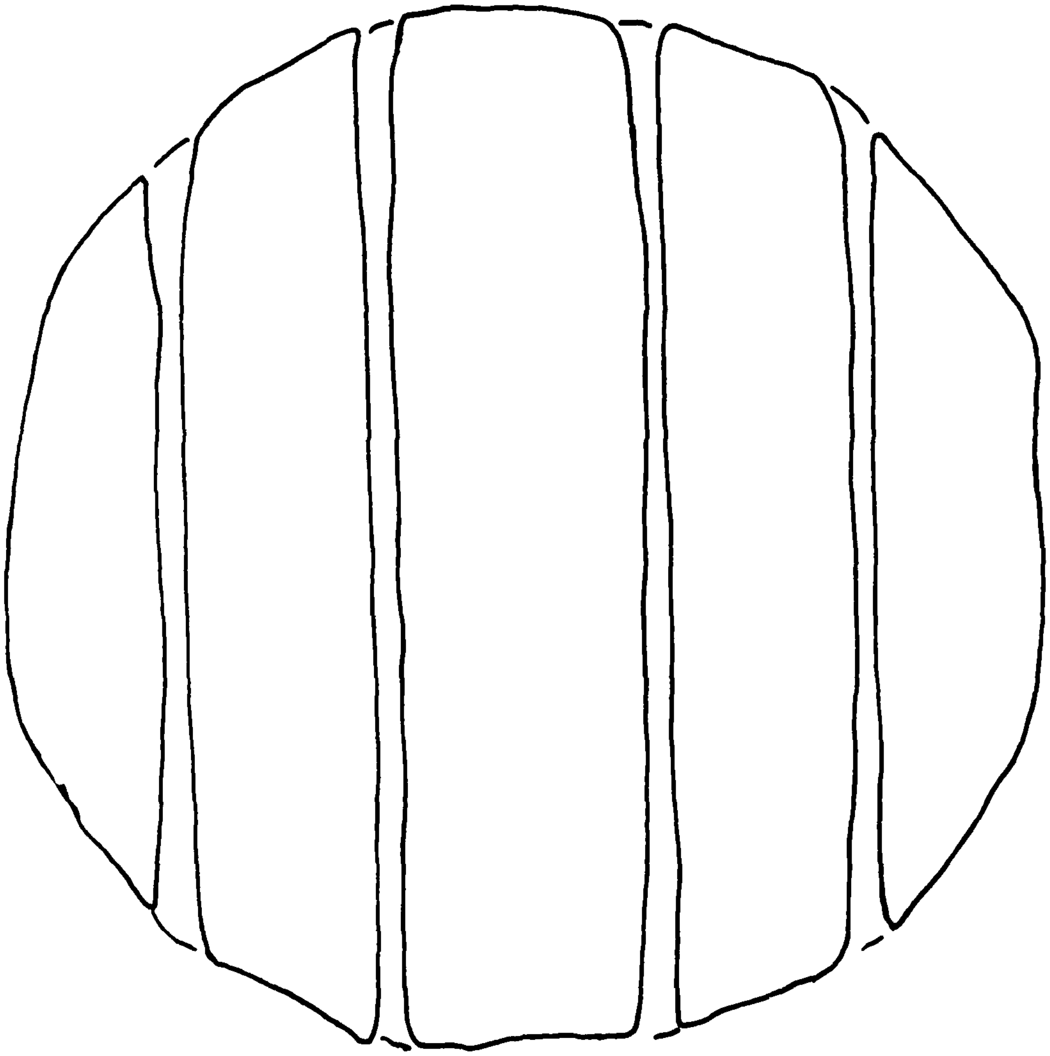


Figure C-56. Tire Contact Prints (Footprints)

[illegible]

[illegible] FOOTPRINT. TIRE SIZE ....[illegible]........ [illegible]
NEW .... USED .... RETREAD BY .... N/A....................
[illegible] NO. ....[illegible]....... CODE NO. ....[illegible]..... [illegible] ....
[illegible] .... IN. MAX. FOOTPRINT [illegible] ..[illegible].. IN.
RATED INFLATION ......[illegible]...... PSI MAX. FOOTPRINT WIDTH ..[illegible].. IN.
[illegible] RATED LOAD ..[illegible]........ LBS. NET CONTACT AREA ..[illegible].. SQ IN.
[illegible] DEFLECTION GROSS CONTACT AREA ..[illegible].. SQ IN.
OPERATOR .... DATE [illegible]/79 SERIAL NO. ....

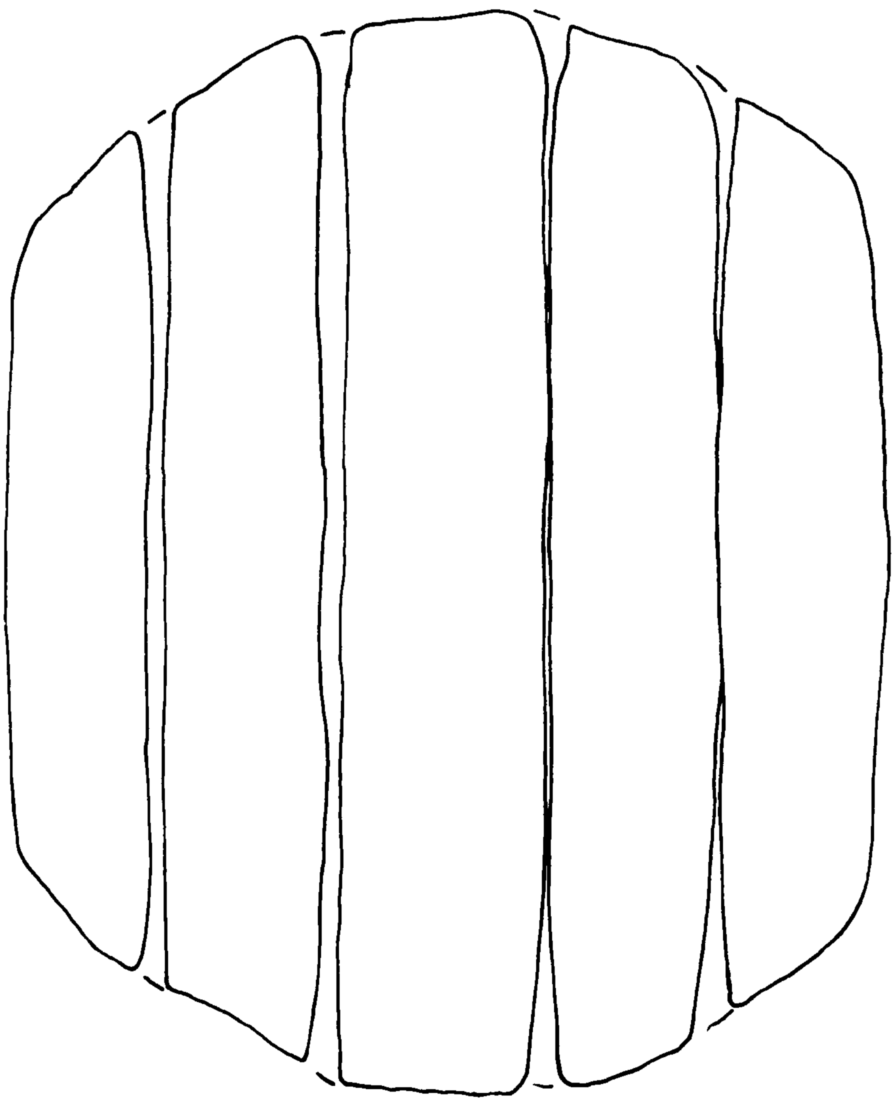


Figure C-57. Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ....7.00-8....... MFR .Zedron.
NEW ...X... USED .... RETREAD BY ....N/A...........................
S. O. NO. ....77-21...... CODE NO. ....109.... FLPL ...X. FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. .6.375.. IN.
RATED INFLATION ....125... PSI MAX. FOOTPRINT WDTH. .6.125.. IN.
..60 % RATED LOAD ...3990...... LBS. NET CONTACT AREA ...27.39 SQ. IN.
.17.78 DEFLECTION GROSS CONTACT AREA .30.54 SQ. IN.
OPERATOR .... DATE 3/20/79 SERIAL NR. .....B029BB3.......

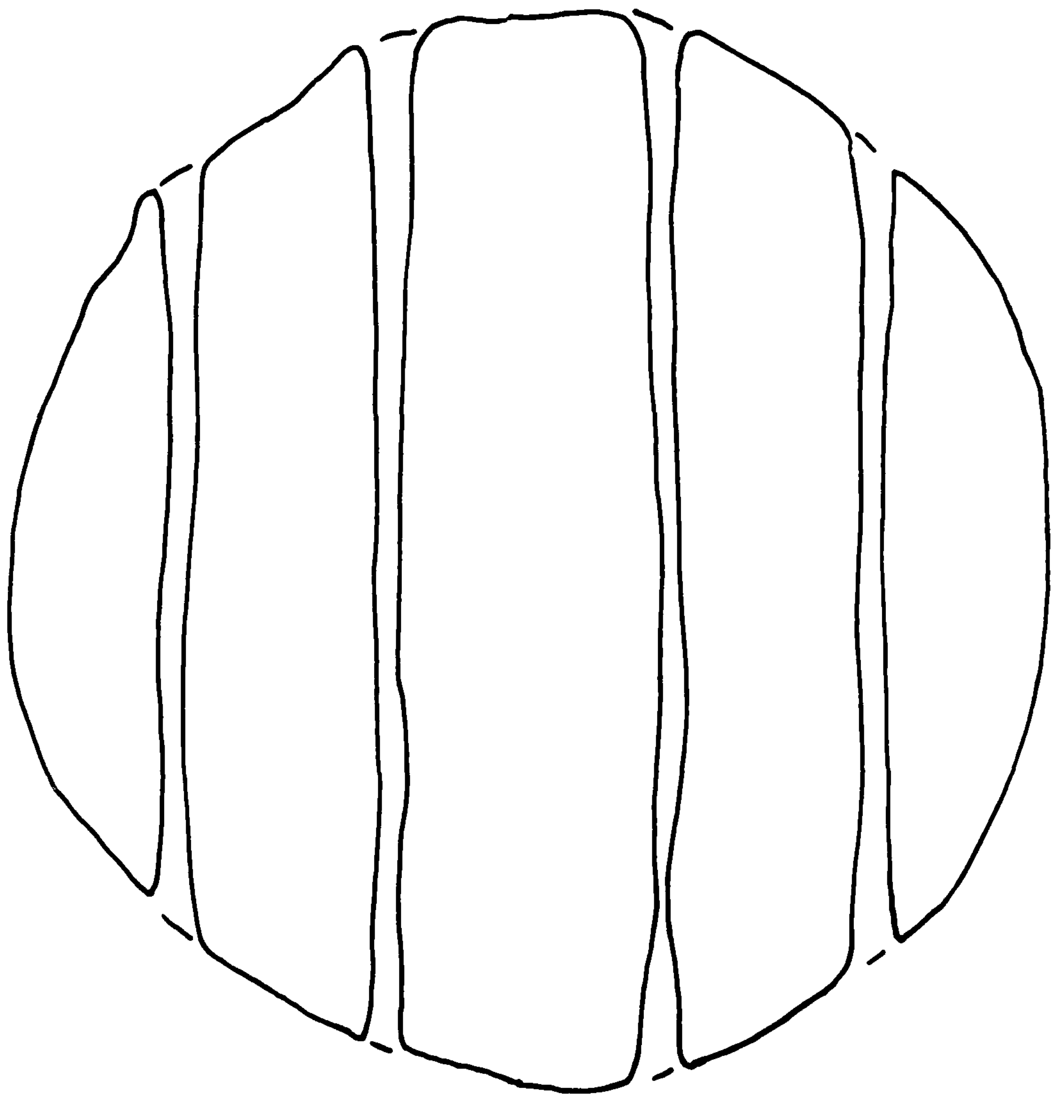


Figure C-58. Tire Contact Prints (Footprints)

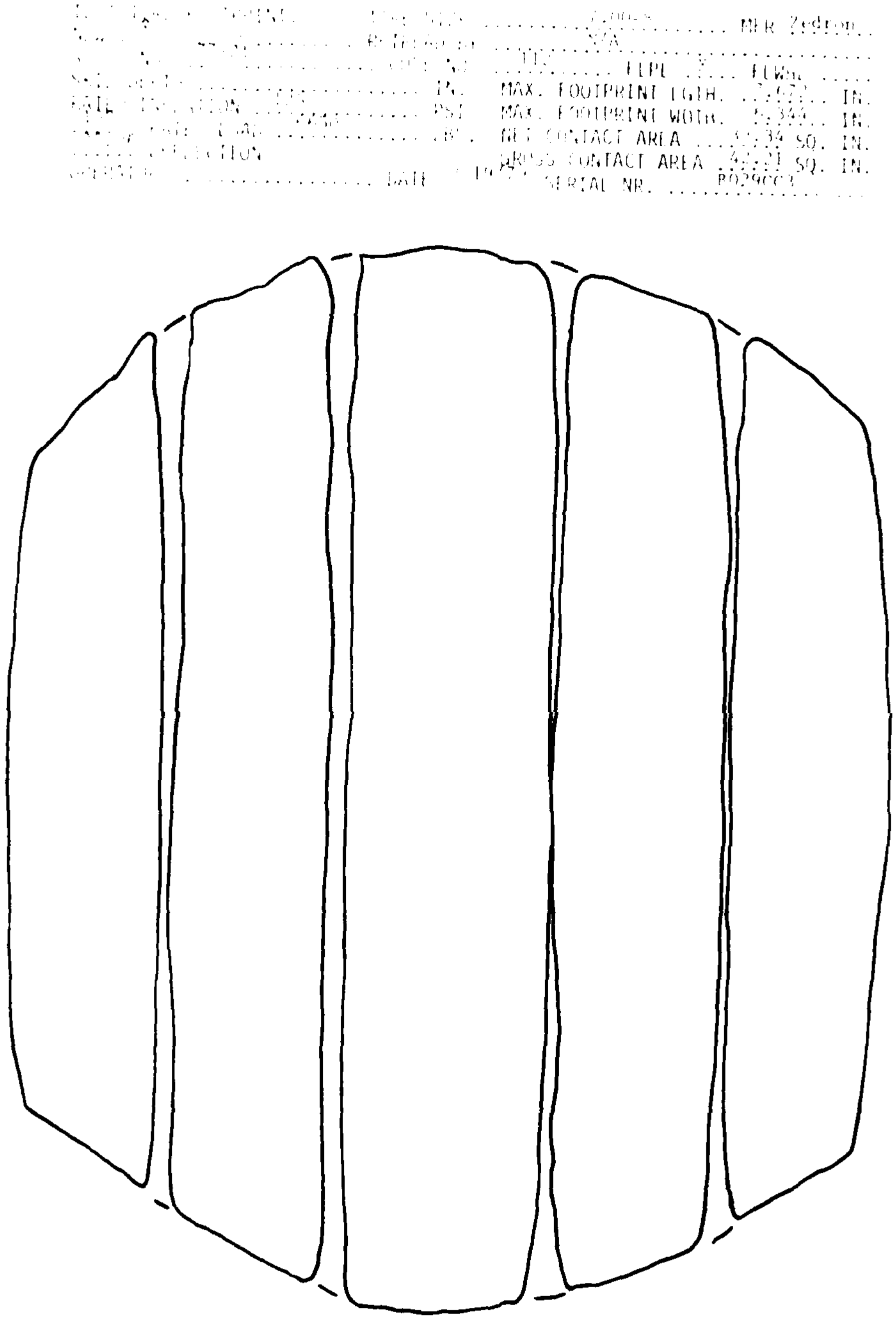


Figure [illegible]. Tire Contact Prints (Footprints)

SERIAL [illegible]

[illegible] TIRE FOOTPRINT: TIRE SIZE .... [illegible]
NEW .... USED .... RETREAD BY ....
[illegible] NO. .... CODE NO. .... [illegible]
[illegible] .... IN. MAX. FOOTPRINT LGTH. .... IN.
[illegible] INFLATION .... PSI MAX. FOOTPRINT WIDTH ....
[illegible] LOAD .... LBS. NET CONTACT AREA .... SQ. IN.
[illegible] DEFLECTION GROSS CONTACT AREA .... SQ. IN
[illegible] .... DATE [illegible] SERIAL NO. ....

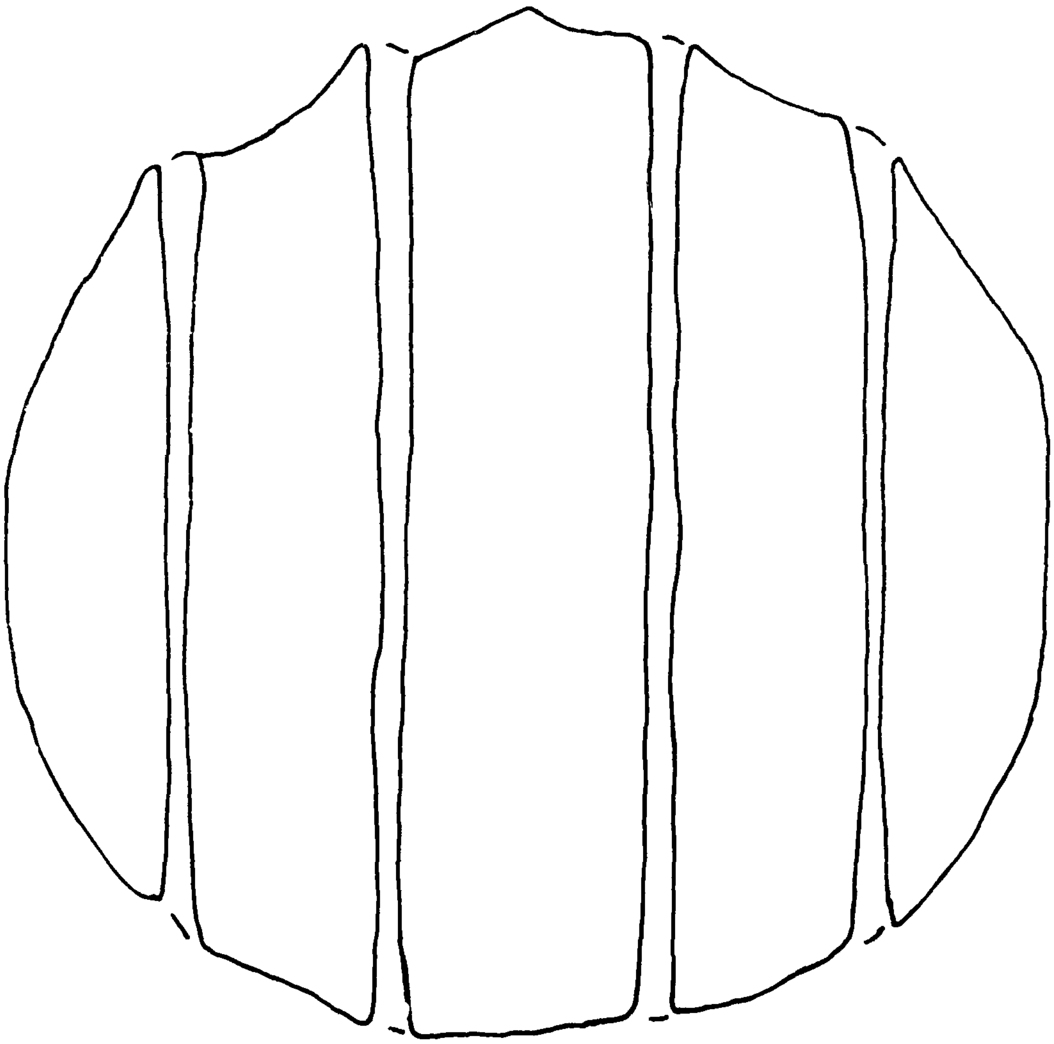


Figure C-60. Tire Contact Prints (Footprints)

[illegible]

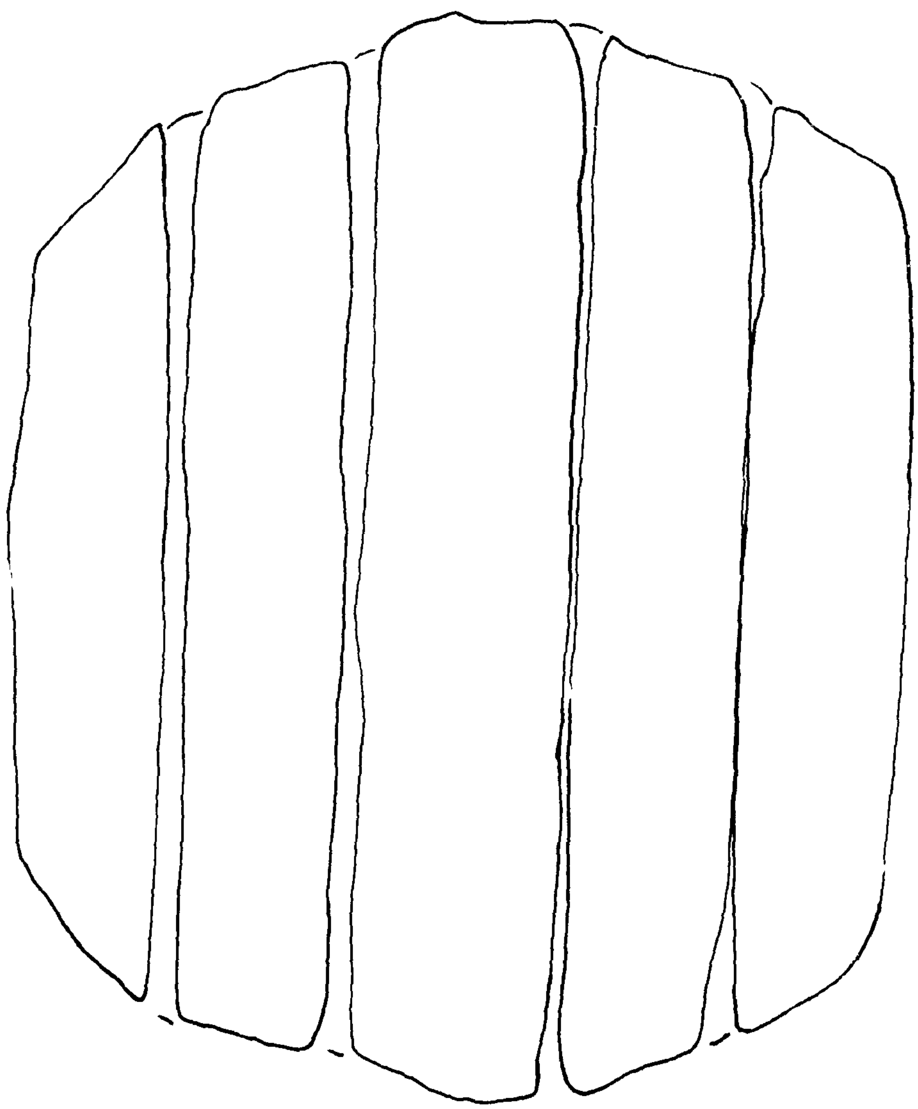


Figure [illegible] Tire Contact Prints (Footprints)

TEST TIRE FOOTPRINT: TIRE SIZE ...7.00-8............. MFR Zedron.
NEW ...X.. USED .... RETREAD BY ....N/A.....................
S. O. NO. ....77-21..... CODE NO. ....115.... FLPL ...X FLWHL .....
SKID DEPTH .... IN. MAX. FOOTPRINT LGTH. 6.313.. IN.
RATED INFLATION 125............. PSI MAX. FOOTPRINT WDTH. 6.078.. IN.
.60. % RATED LOAD 3990......... LBS. NET CONTACT AREA ...27.20 SQ. IN.
17.46. DEFLECTION GROSS CONTACT AREA .30.84 SQ. IN.
OPERATOR .... DATE 3/20/79 SERIAL NR. .....B029DD3......

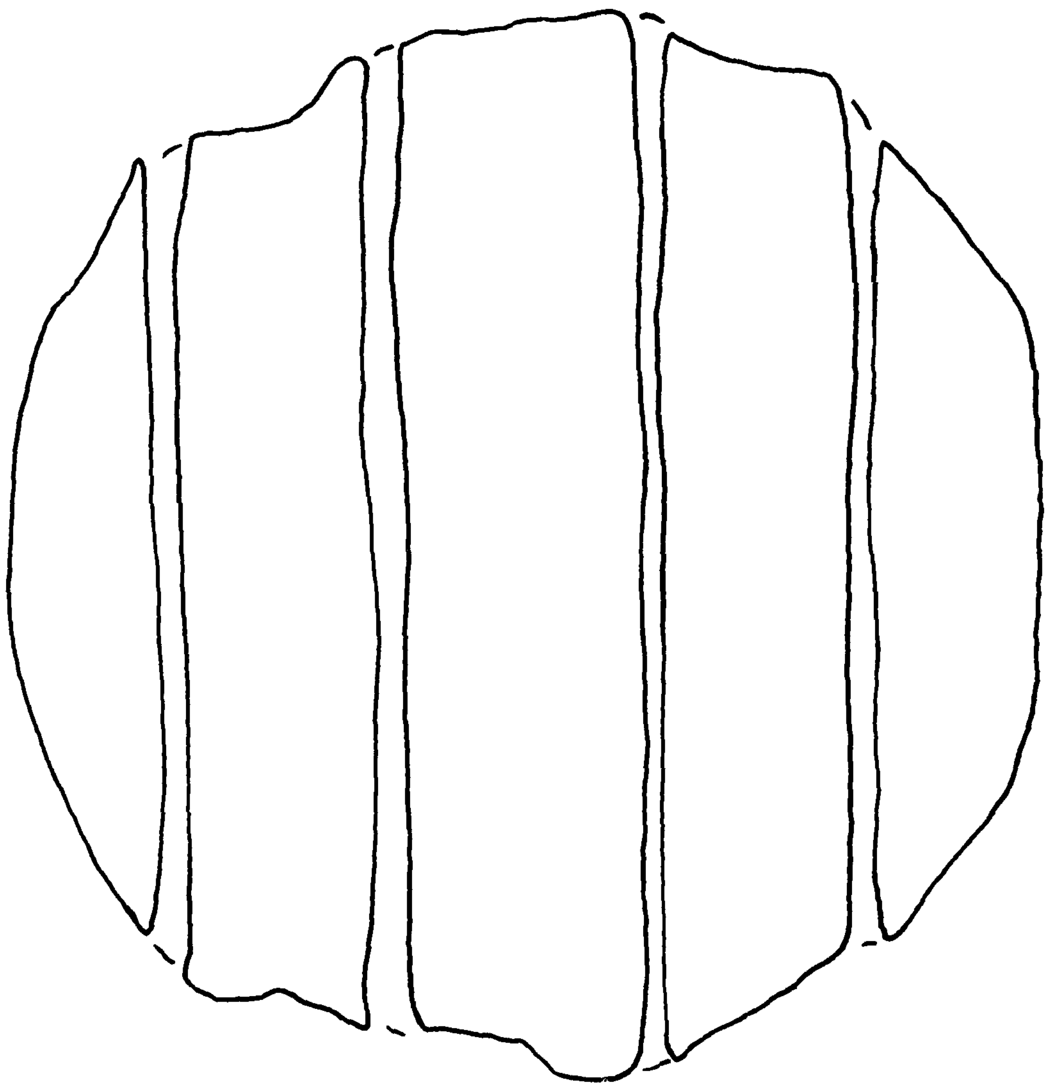


Figure C-62. Tire Contact Prints (Footprints)

APPENDIX D

VERTICAL LOAD VS VERTICAL DEFLECTION PLOTS

Notes: For the following plots

1. Inflation Pressures are in PSIG
2. Outside Diameter (OD) in inches
3. Cross Section (CS) in inches

CAST TIRE EVALUATION

FLAT PLATE

S/N [illegible] (STANDARD TIRE)

PRESS.	OD	CS
90	20.453	7.000
125	20.500	7.016
160	20.57[illegible]	7.016

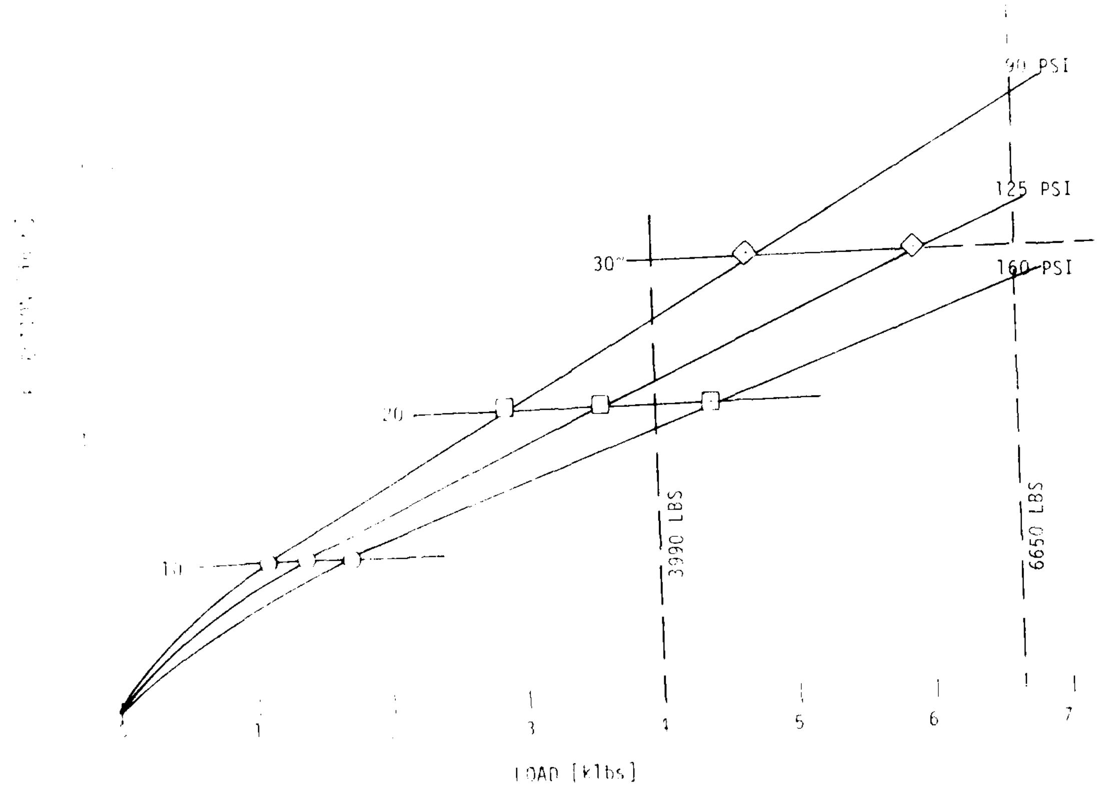


Figure D-1. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N 09?? (STANDARD TIRE)

PRESS	OD	CS
90	20.453	6.953
125	20.516	7.016
160	20.578	7.016

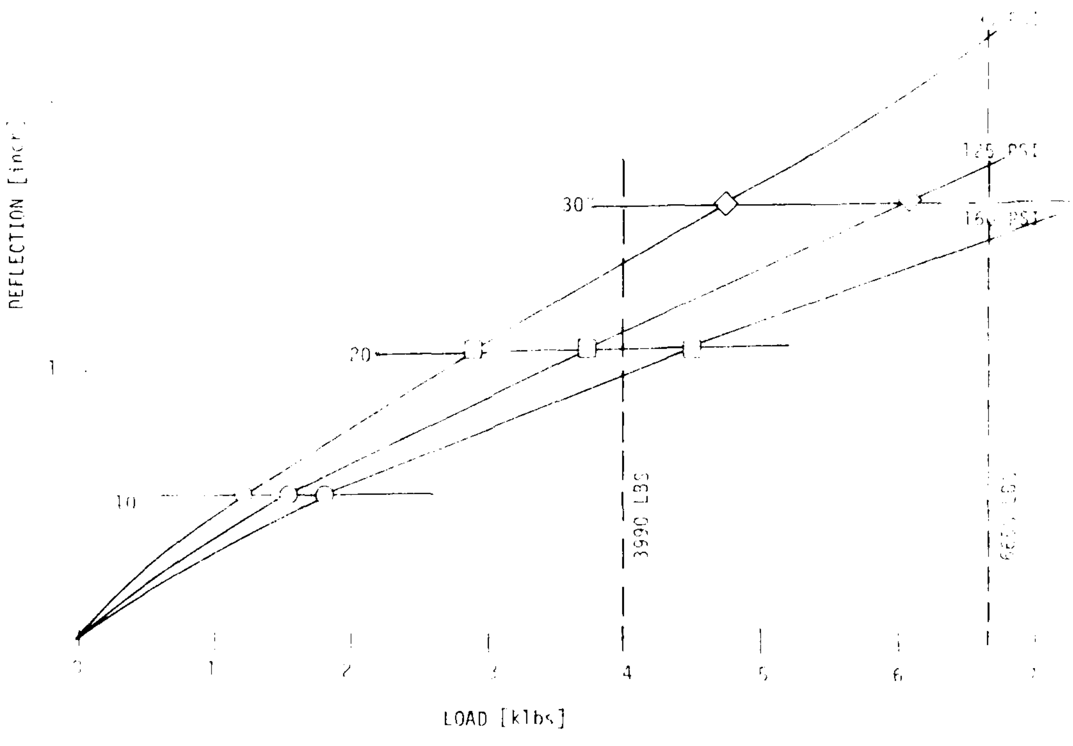


Figure [illegible]. Deflection vs. Load

CAST TIRE EVALUATION

FLAT PLATE

S/N A077A1

PRESS.	OD	CS
90	20.278	8.228
125	20.394	8.216
160	20.506	8.210

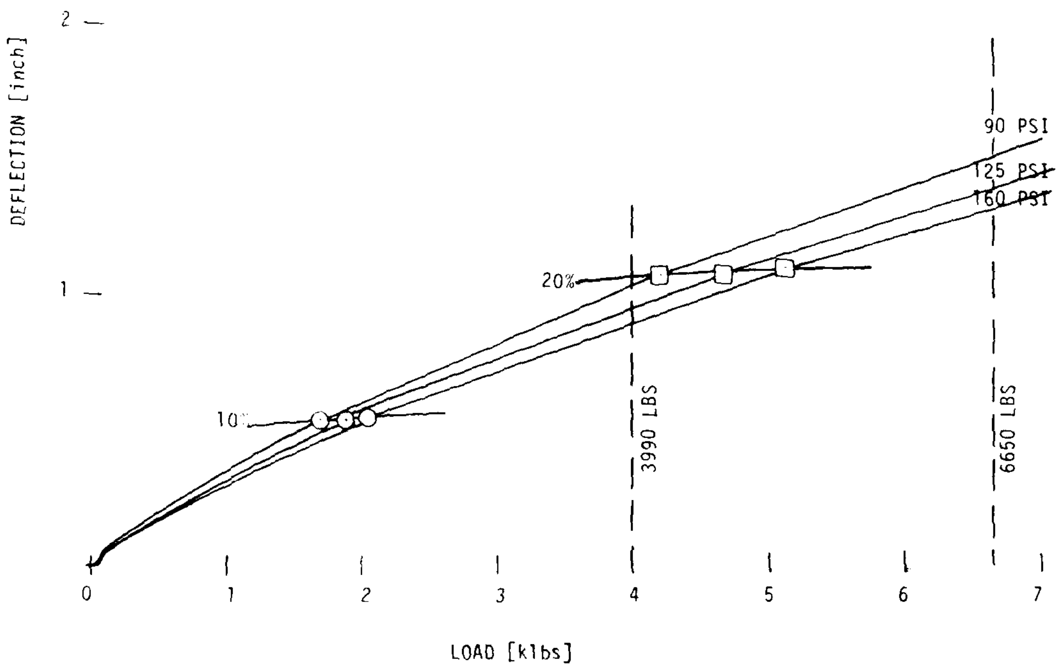


Figure D-3. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N A077A1

PRESS.	OD	CS
90	20.274	8.297
125	20.392	8.224
160	20.502	8.215

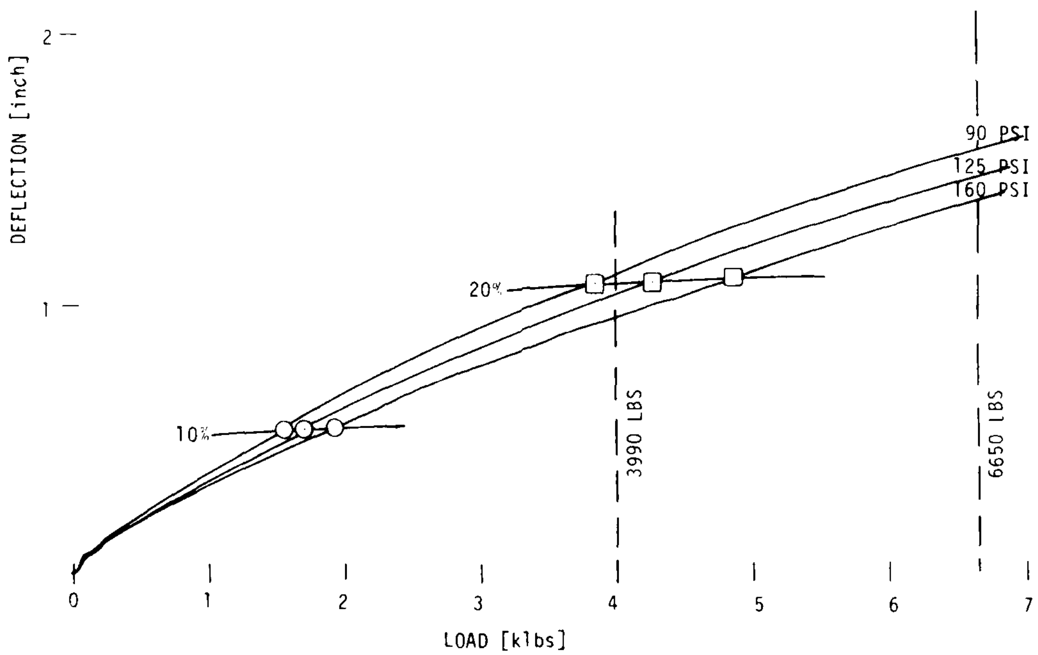


Figure D-4. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N A0978B1

PRESS.	[illegible]	[illegible]
90	20.769	.119
125	[illegible].492	.107
150	[illegible].649	.111

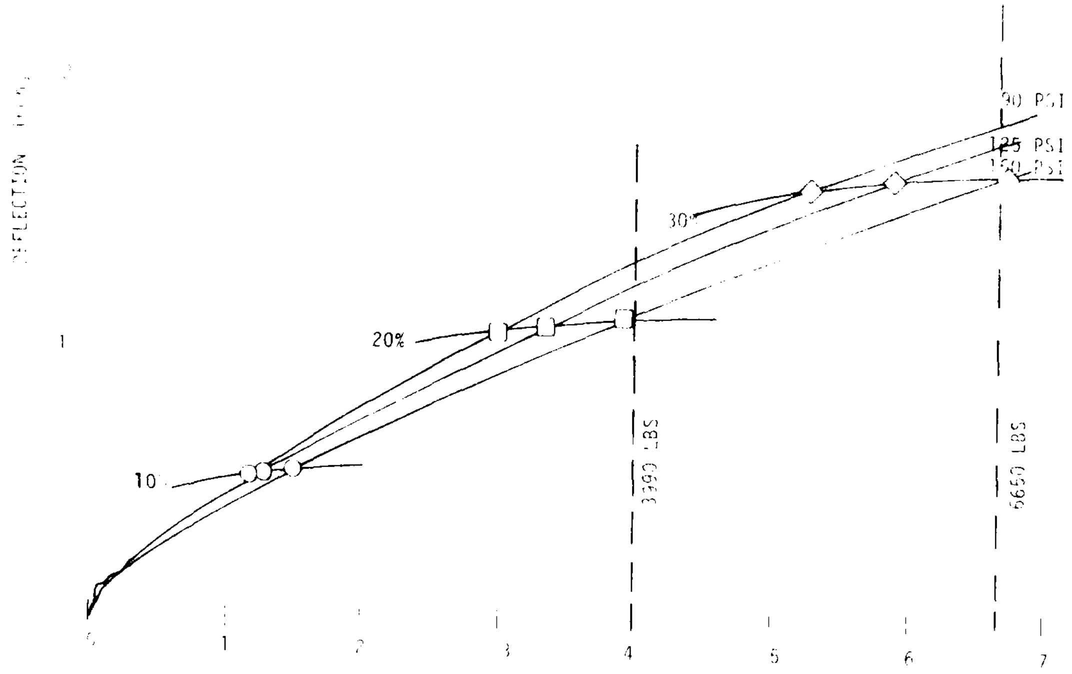


Figure [illegible] Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (34" DIA.)

S/N A097BP1

PRESS.	[illegible]	[illegible]
95	[illegible]	[illegible]
125	[illegible]	[illegible]
160	[illegible]	.114

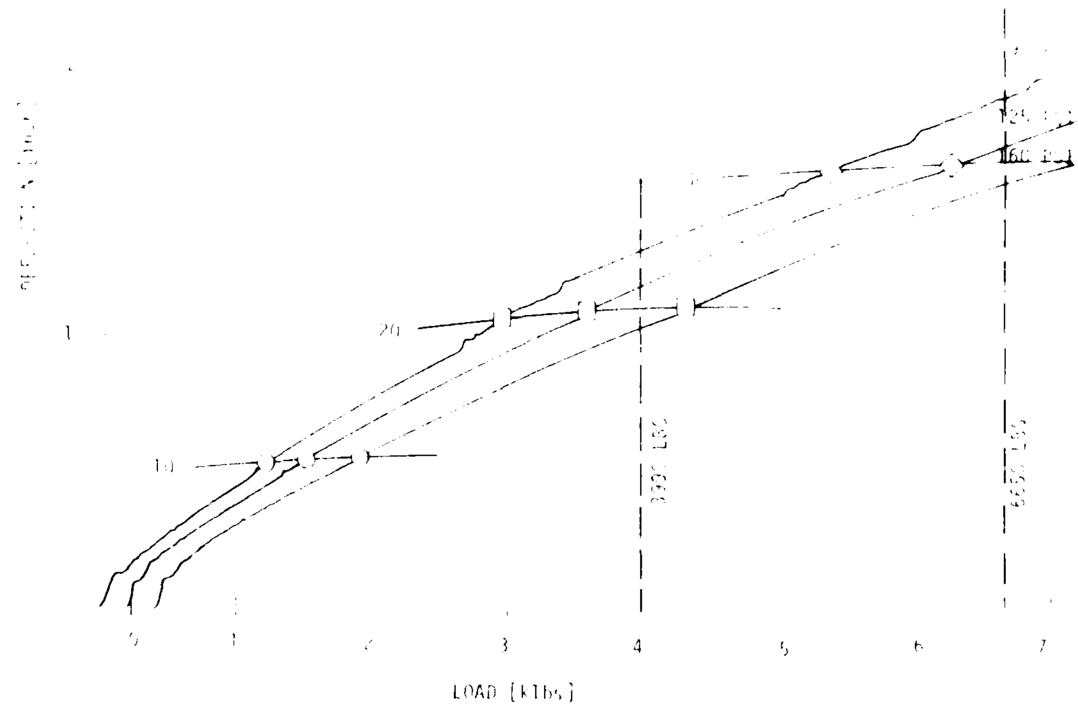


Figure D-6. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N A028C4

PRESS.	OD	CS
90	20.330	8.320
125	20.500	8.310
160	20.698	8.312

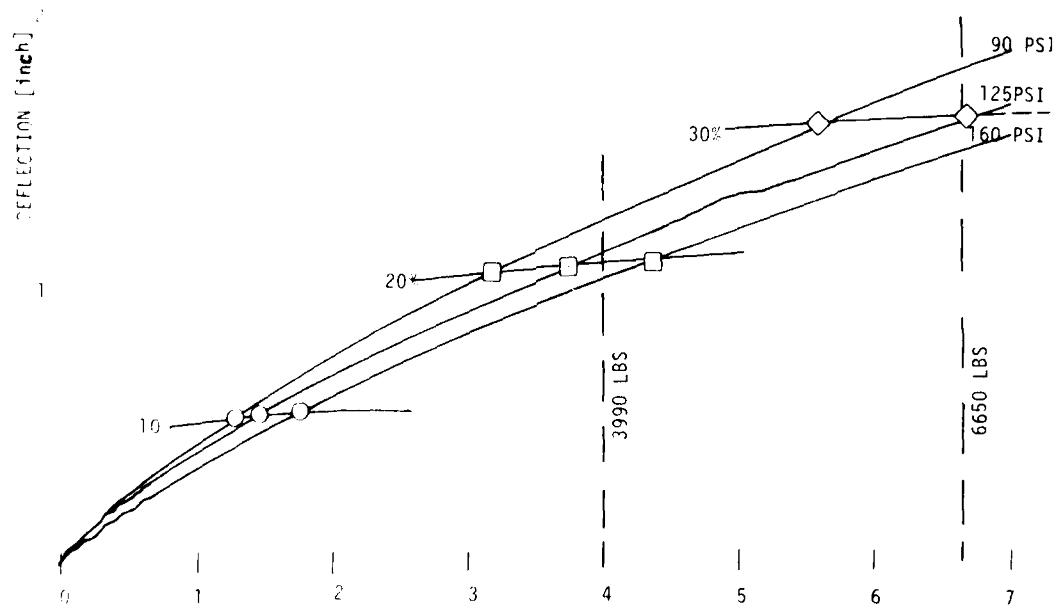


Figure D-7. Deflection Vs Load

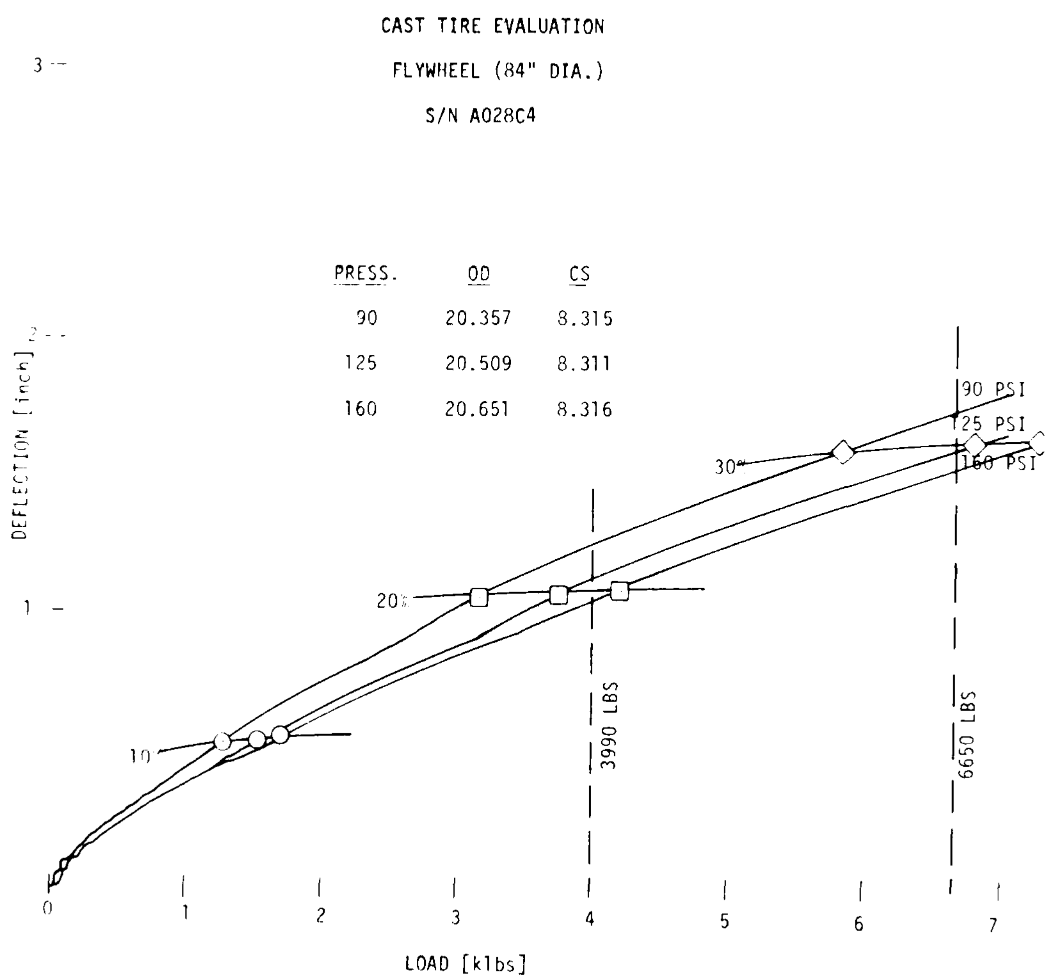


Figure D-8. Deflection Vs Load

FAST TIRE EVALUATION

FLAT PLATE

S/N B097A

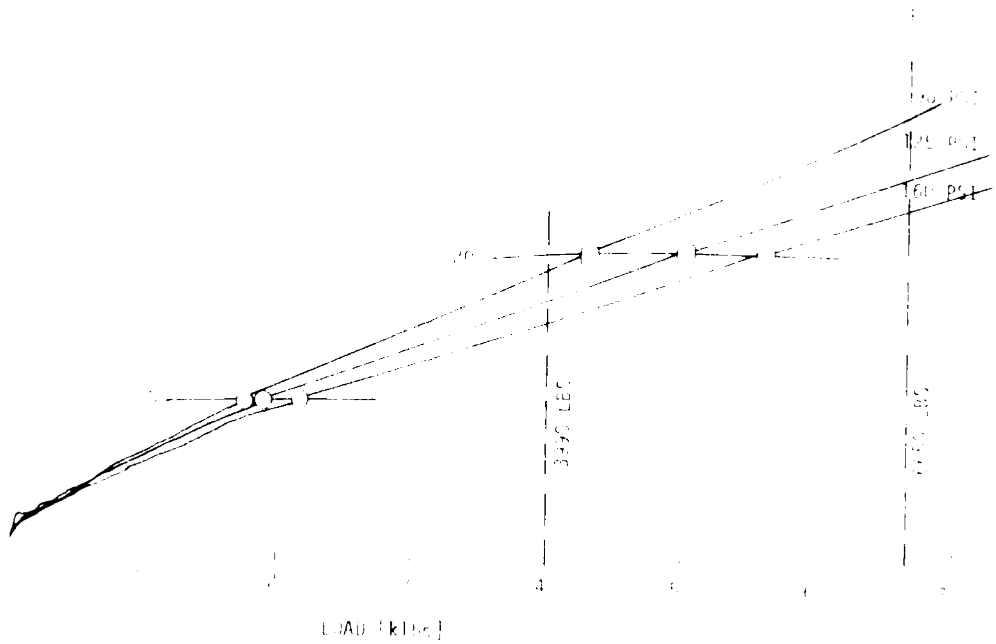


Figure ... Deflection ...

CAST TIRE EVALUATION

FLAT PLATE

S/N B02884

PRESS.	OD	CS
90	20.611	8.427
125	20.683	8.446
160	20.725	8.472

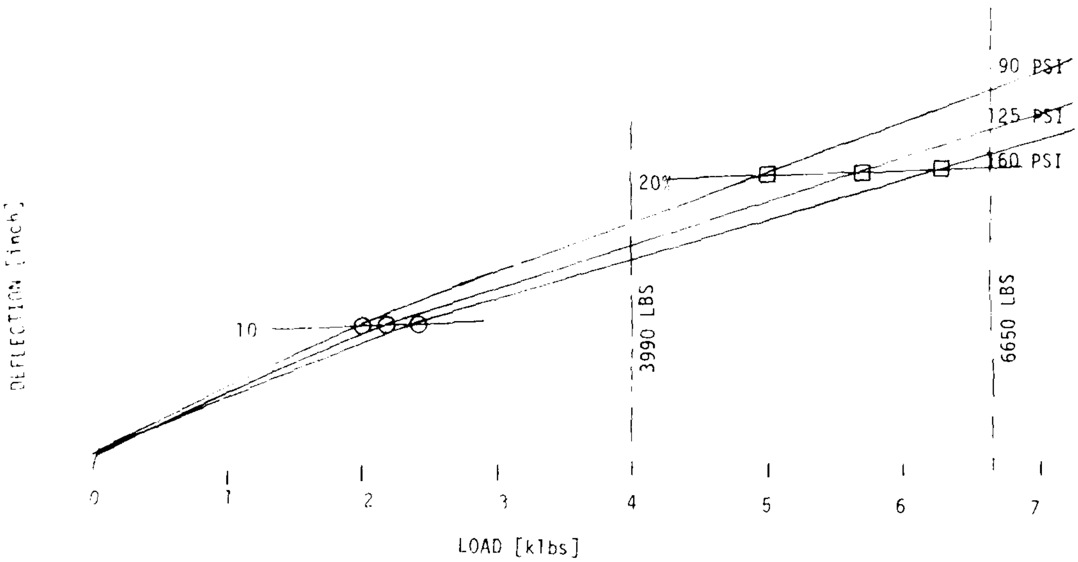


Figure D-11. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B[illegible]28B4

[illegible]	OD	CS
[illegible]	[illegible]	8.441
[illegible]	[illegible]	8.467
[illegible]	[illegible]	8.494

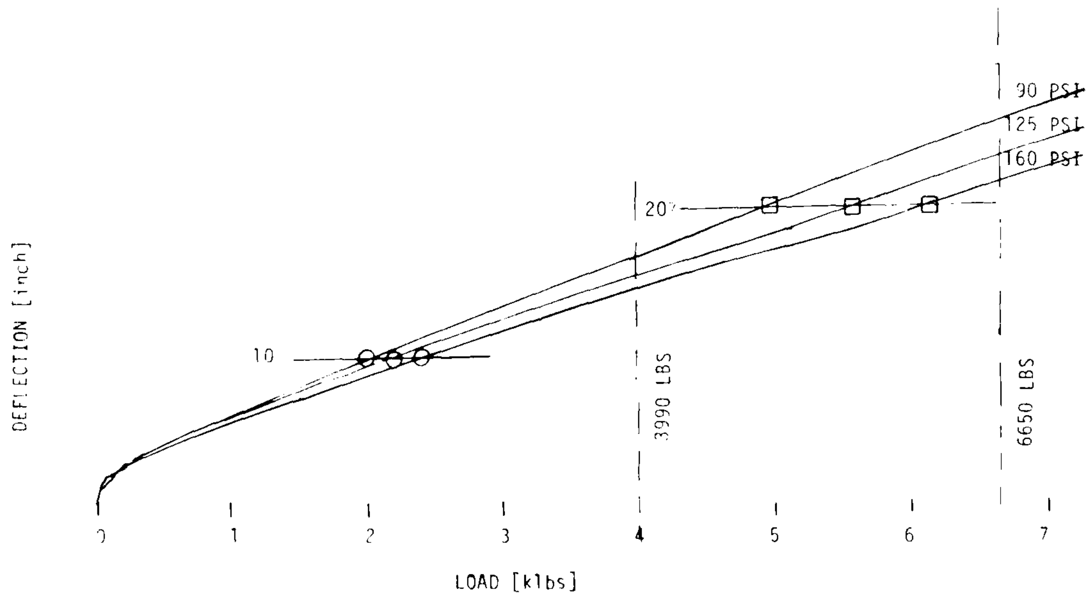


Figure D-12. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B078C4

PRESS.	OD	CS
90	20.790	8.474
125	20.850	8.533
160	20.894	8.607

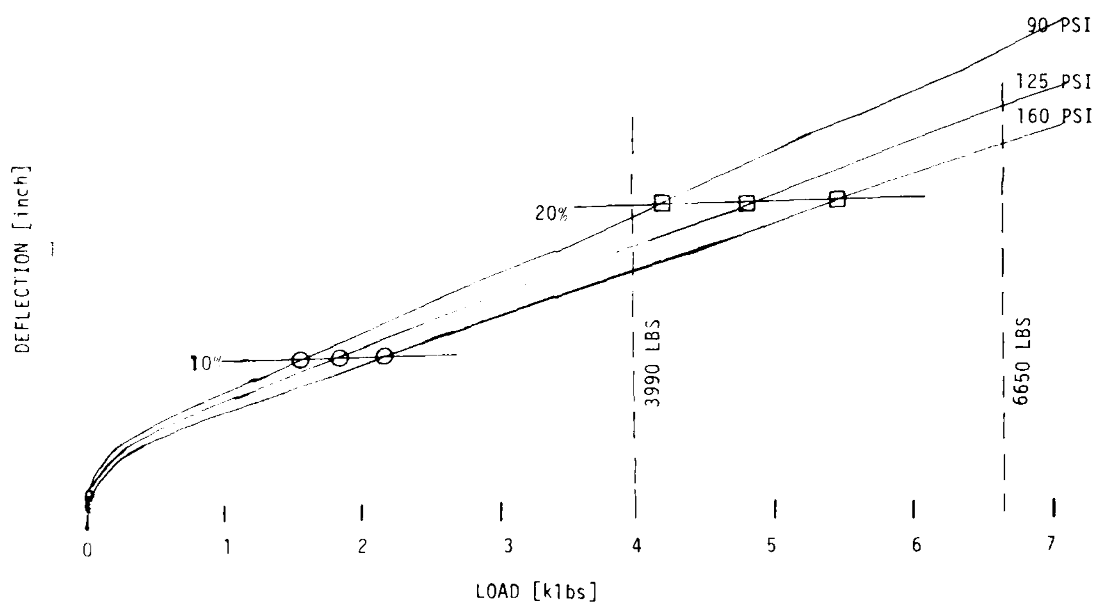


Figure D-15. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B078C4

PRESS.	OD	CS
90	20.803	8.470
125	20.837	8.521
160	20.879	8.593

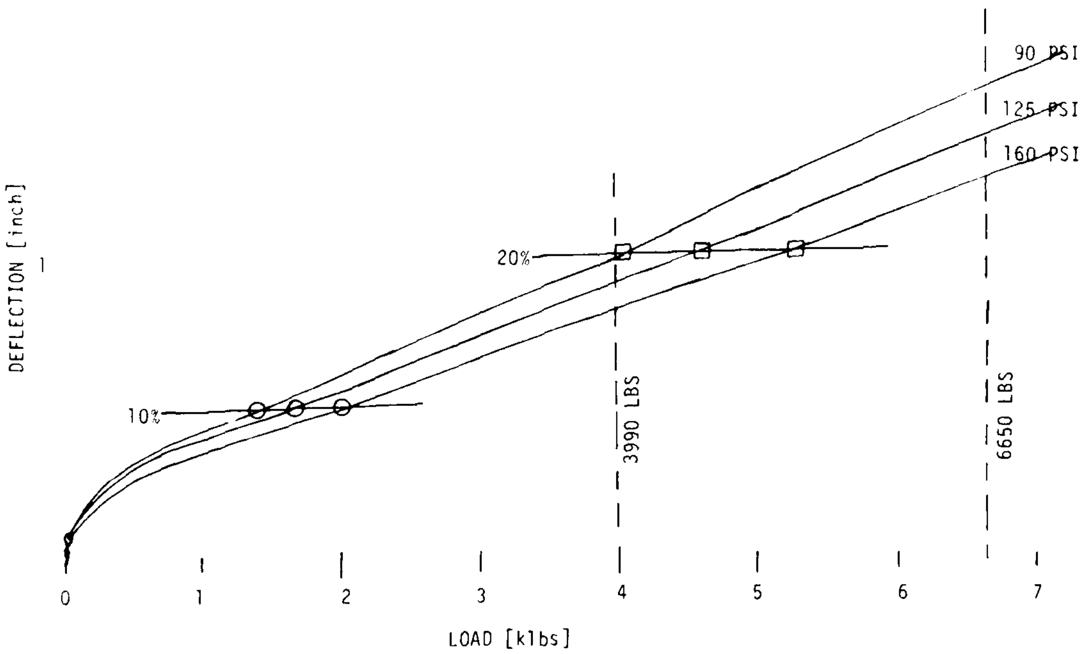
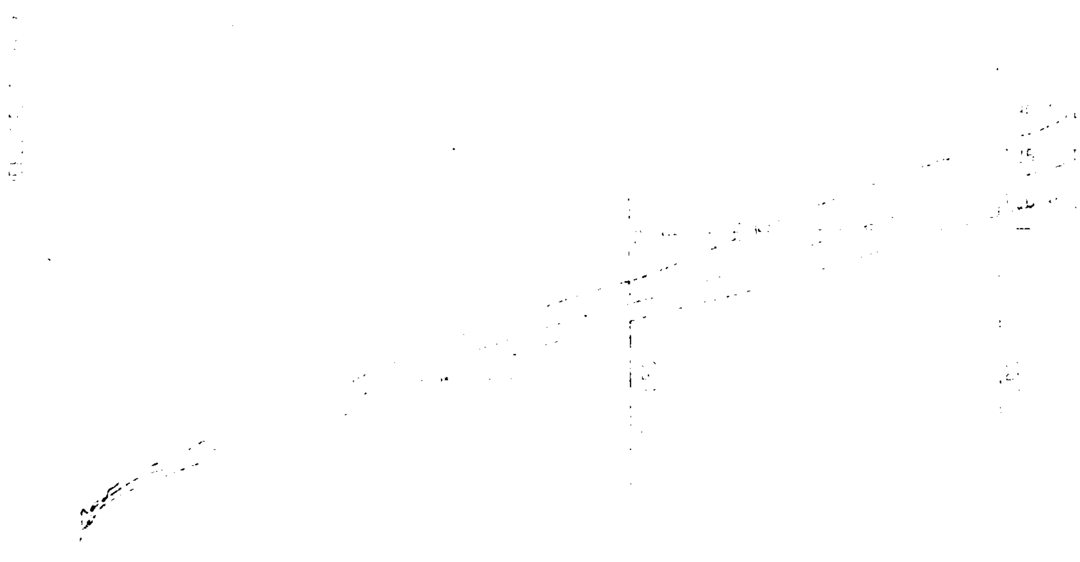


Figure D-16. Deflection Vs Load



CAST TIRE EVALUATION

FLAT PLATE

S/N B08814

PRESS.	OD	CS
90	20.740	8.387
125	20.792	8.447
160	20.834	8.525

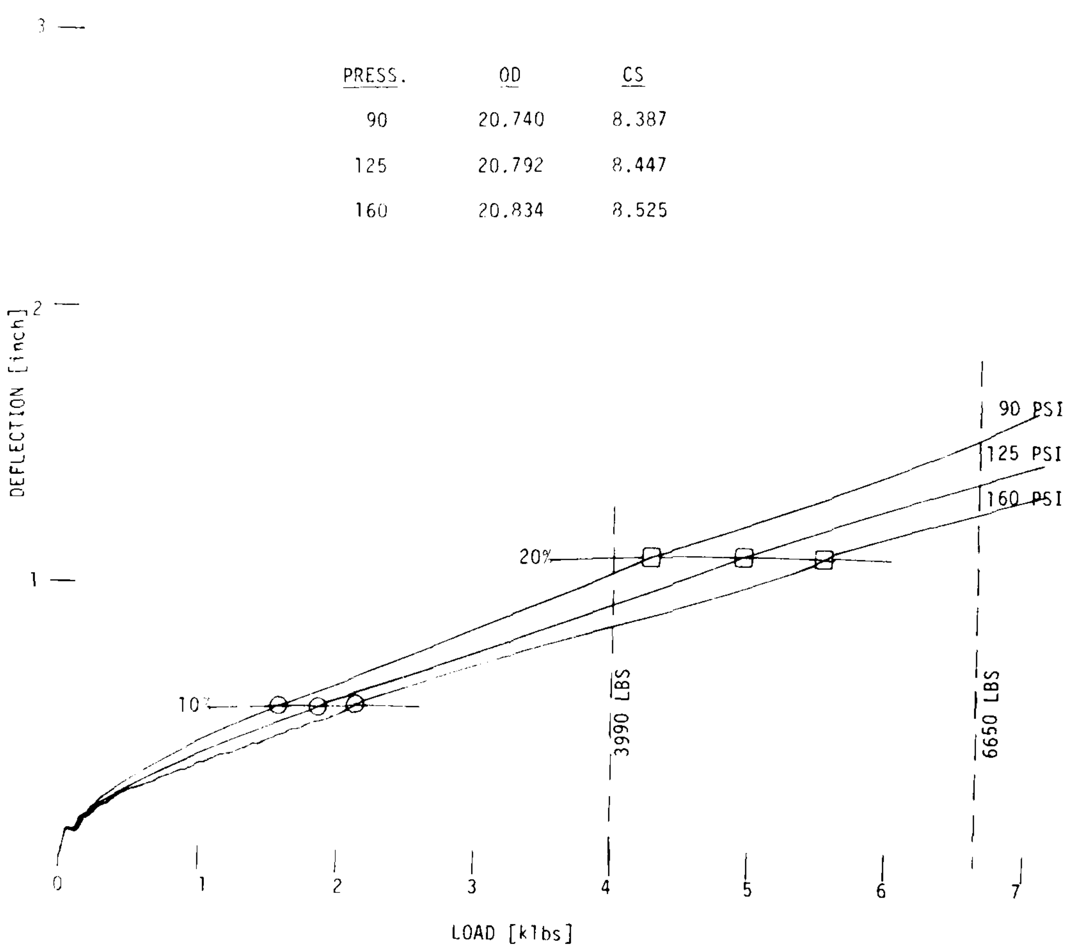


Figure D-19. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B088I4

PRESS.	OD	CS
90	20.756	8.402
125	20.796	8.461
160	20.834	8.534

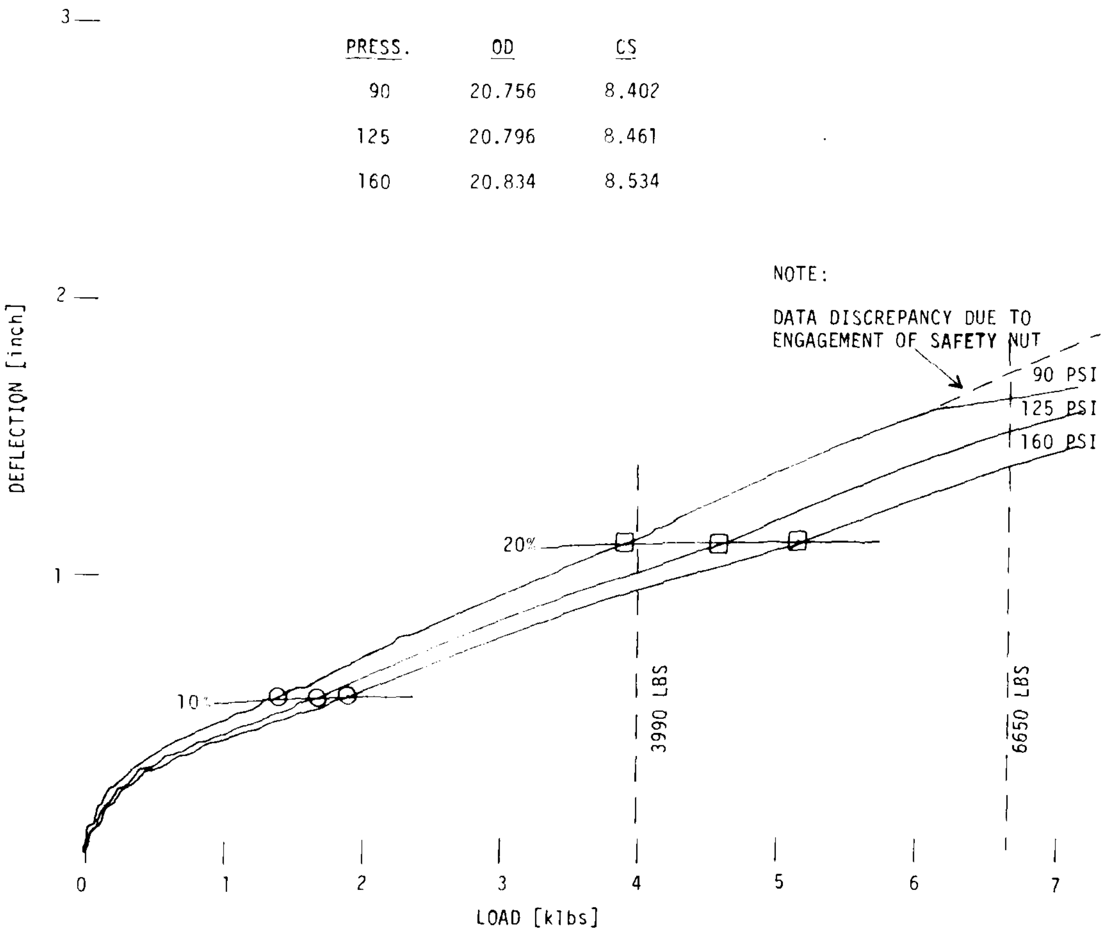


Figure D-20. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B088K4

PRESS.	OD	CS
90	20.748	8.263
125	20.842	8.280
160	20.894	8.321

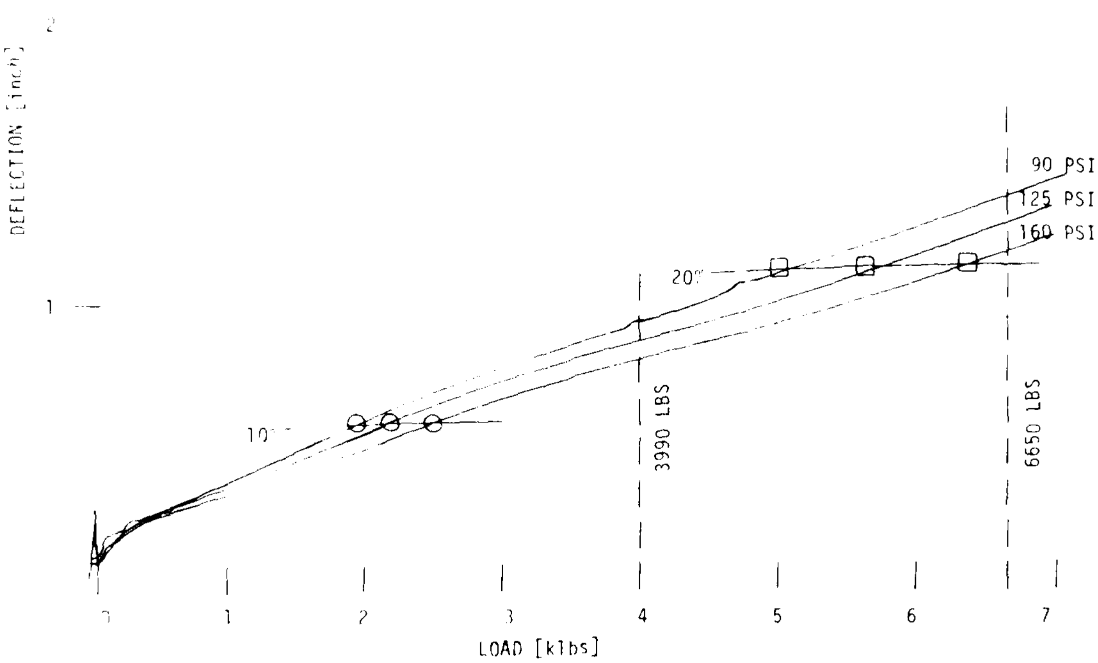


Figure D-23. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (34" DIA.)

S/N B038K4

PRESS.	OD	CS
90	20.742	8.267
125	20.836	8.276
160	20.886	8.314

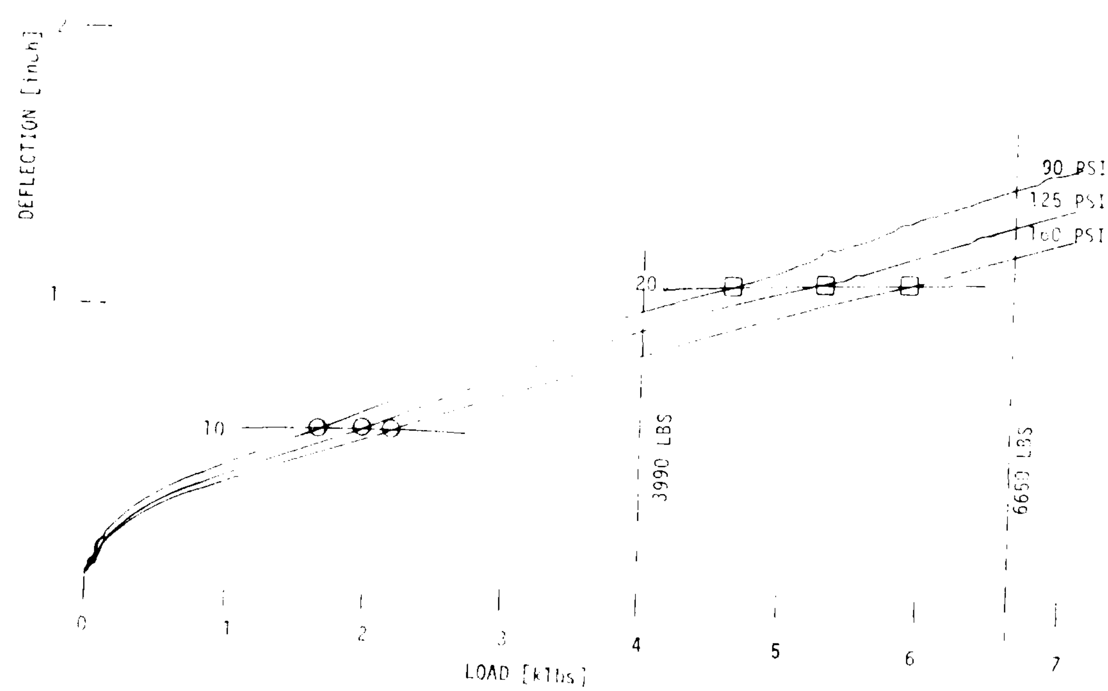


Figure D-24. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL ([illegible]4" DIA.)

S/N B094[illegible]

PRESS.	OD	CS
90	20.910	8.256
125	20.[illegible]64	8.269
160	20.900	[illegible]

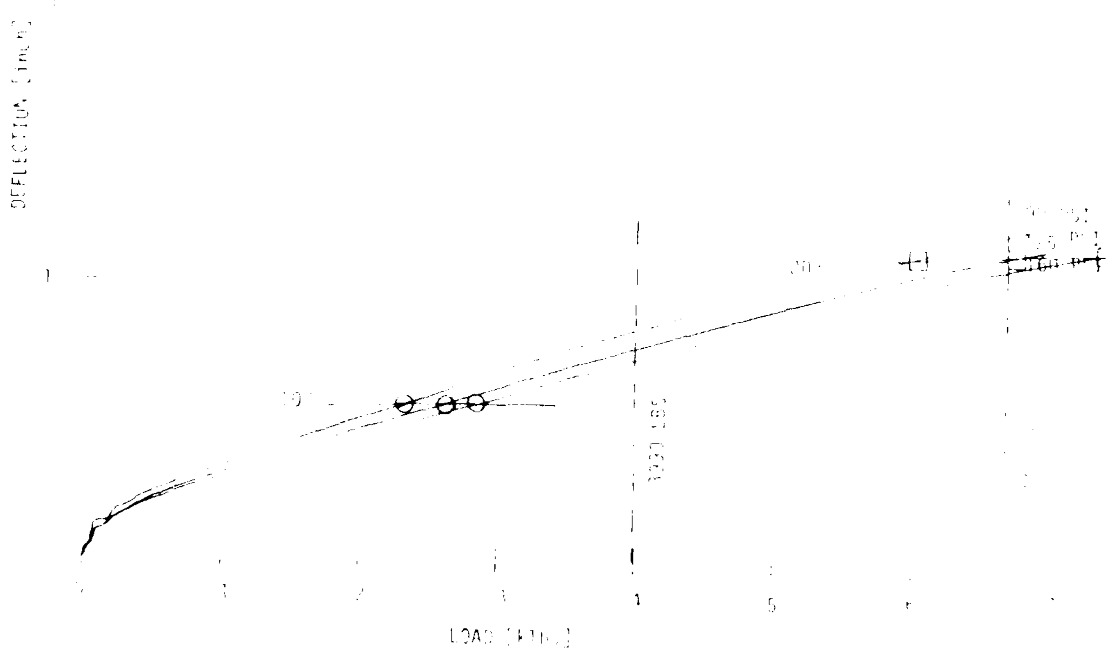


Figure B-6. Deflection vs. Load

AD-A097 684 AIR FORCE WRIGHT AERONAUTICAL LABS WRIGHT-PATTERSON AFB OH F/G 1/3
STATIC AND DYNAMIC EVALUATION OF A-37 CAST AND CAST CARCASS/INT--ETC(U)
NOV 80 P C ULRICH
UNCLASSIFIED AFWAL-TR-80-3055 NL

4 OF 4
AD
A097684

END
DATE
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5 81
DTIC

CAST TIRE EVALUATION

FLAT PLATE

S/N B098M2

PRESS.	OD	CS
90	20.852	8.399
125	20.910	8.417
160	20.952	8.441

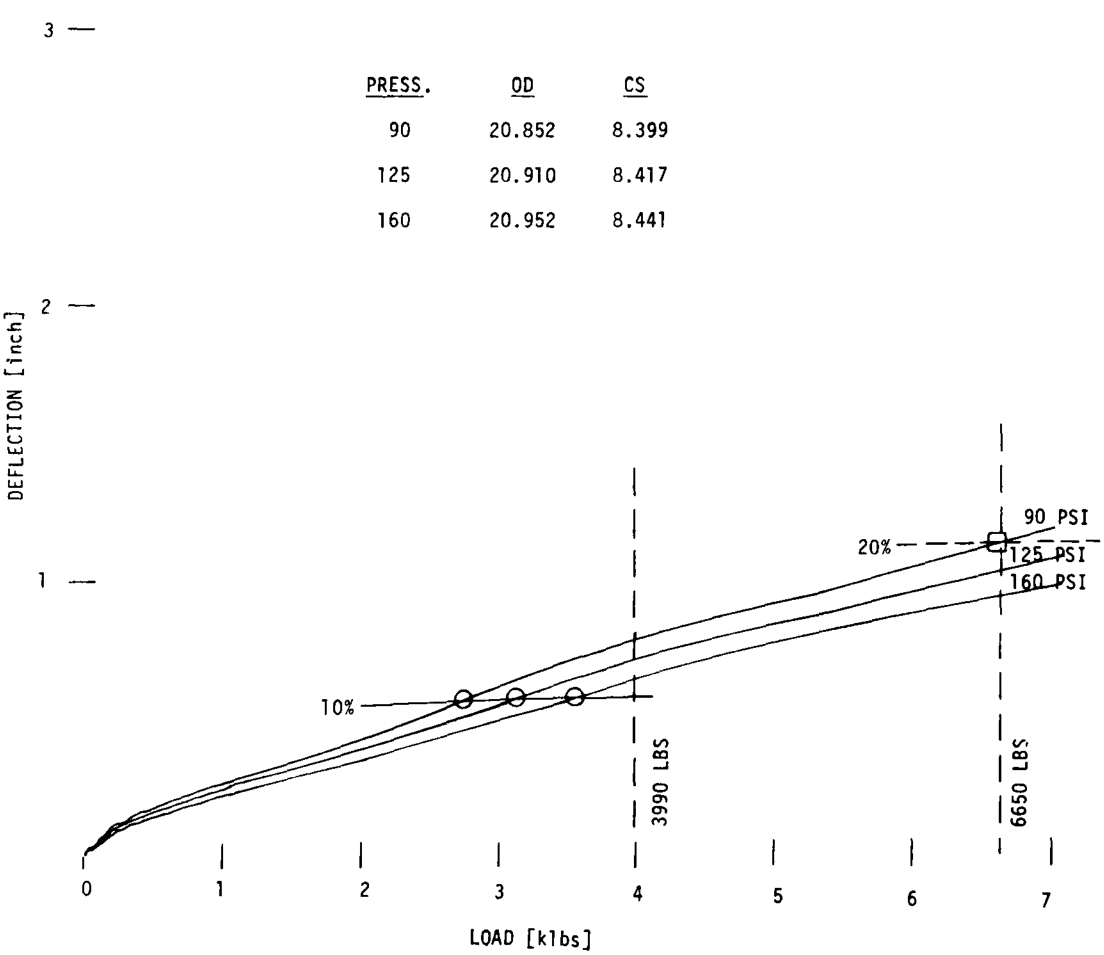

Figure D-27. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B098M2

PRESS.	OD	CS
90	20.850	8.395
125	20.924	8.418
160	20.982	8.454

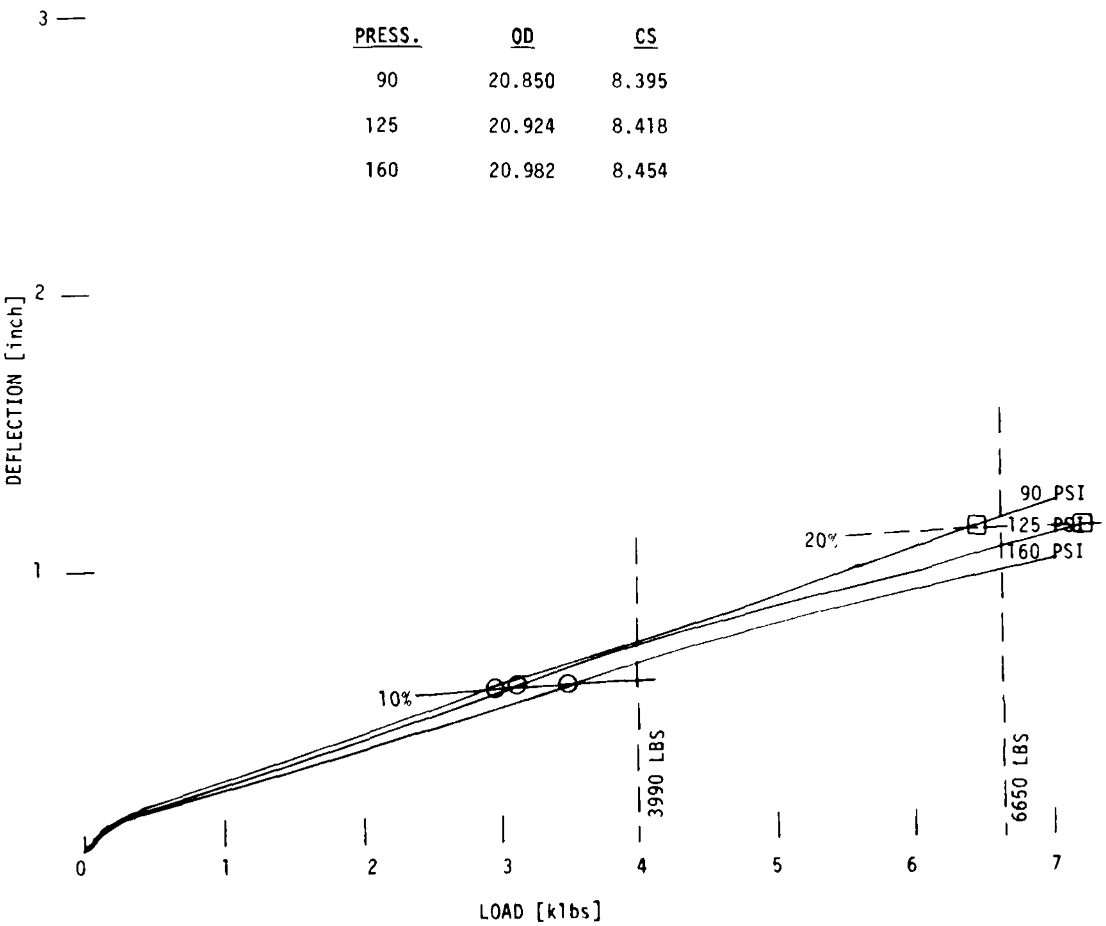

Figure D-28. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B098N2

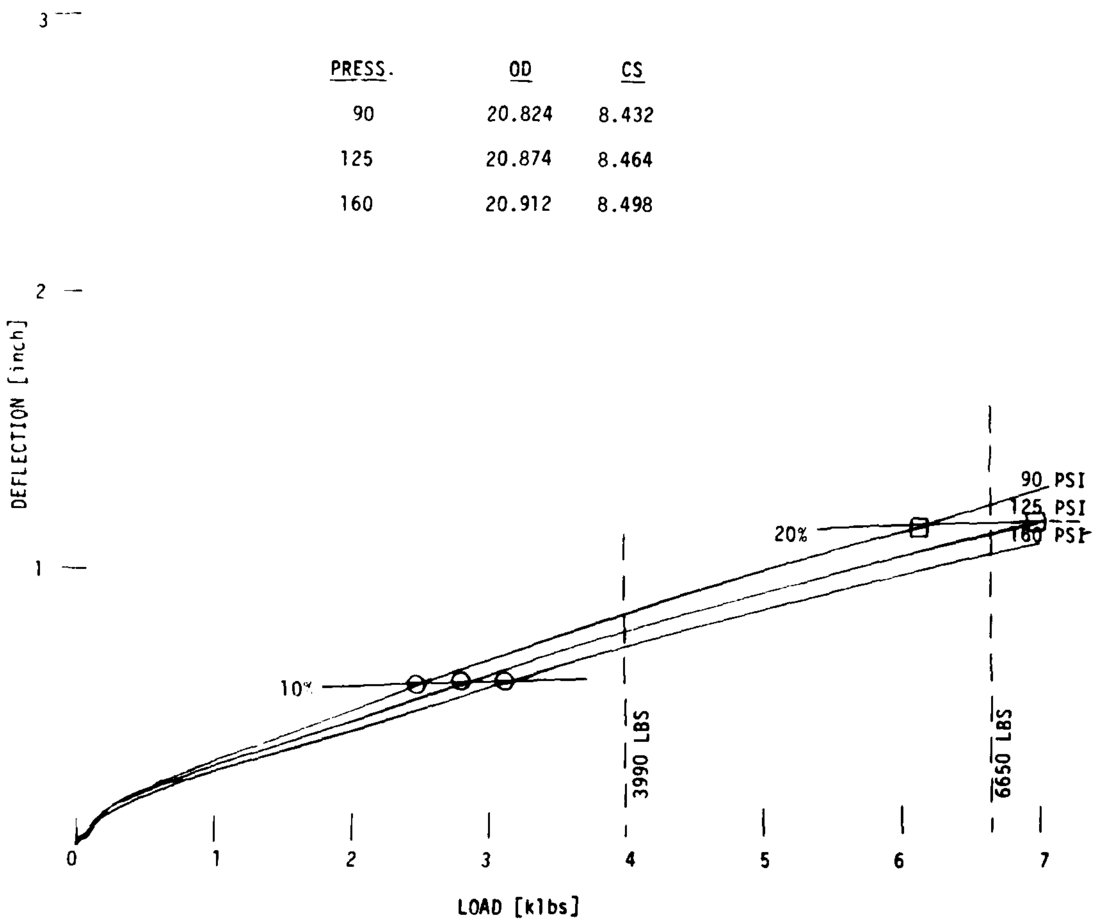

Figure D-29. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B098N2

PRESS.	OD	CS
90	20.804	8.411
125	20.864	8.437
160	20.908	8.478

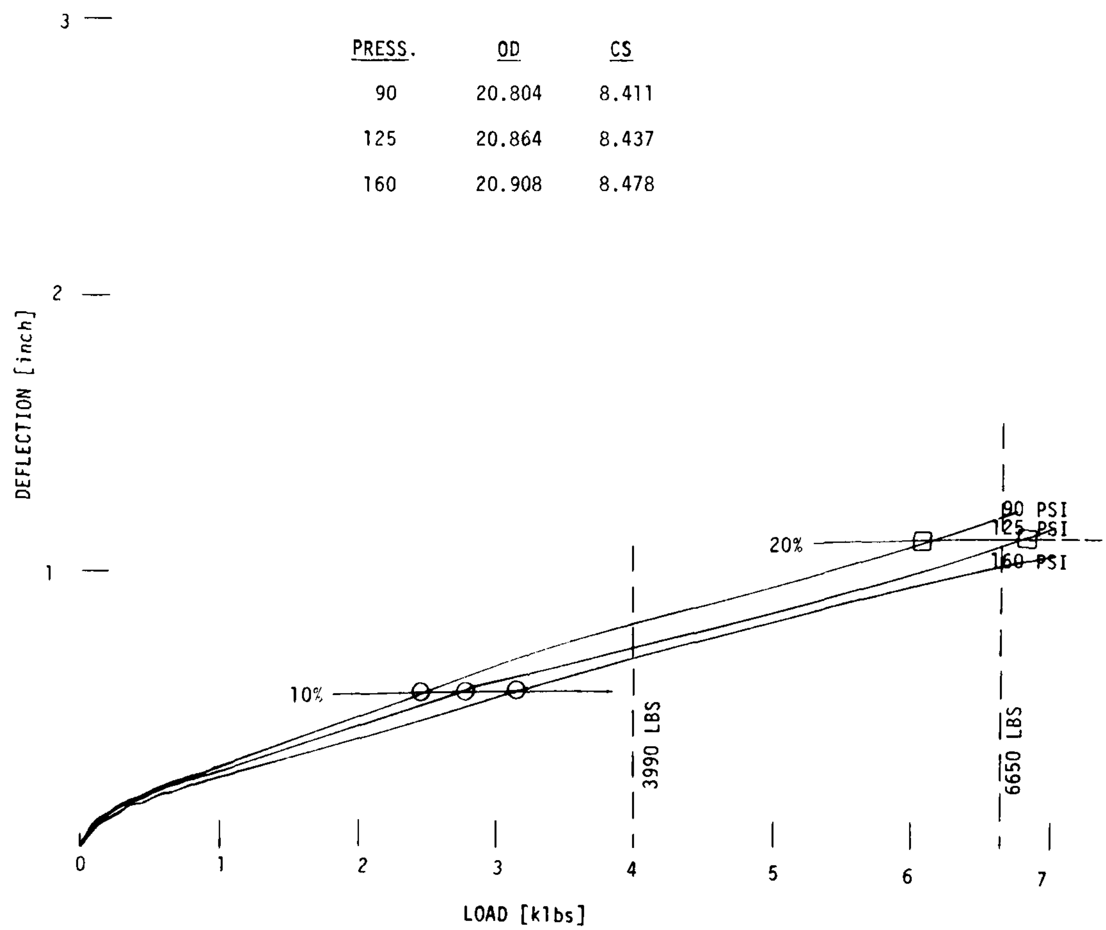

Figure D-30. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B09802

PRESS.	OD	CS
90	20.701	8.338
125	20.766	8.366
160	20.812	8.411

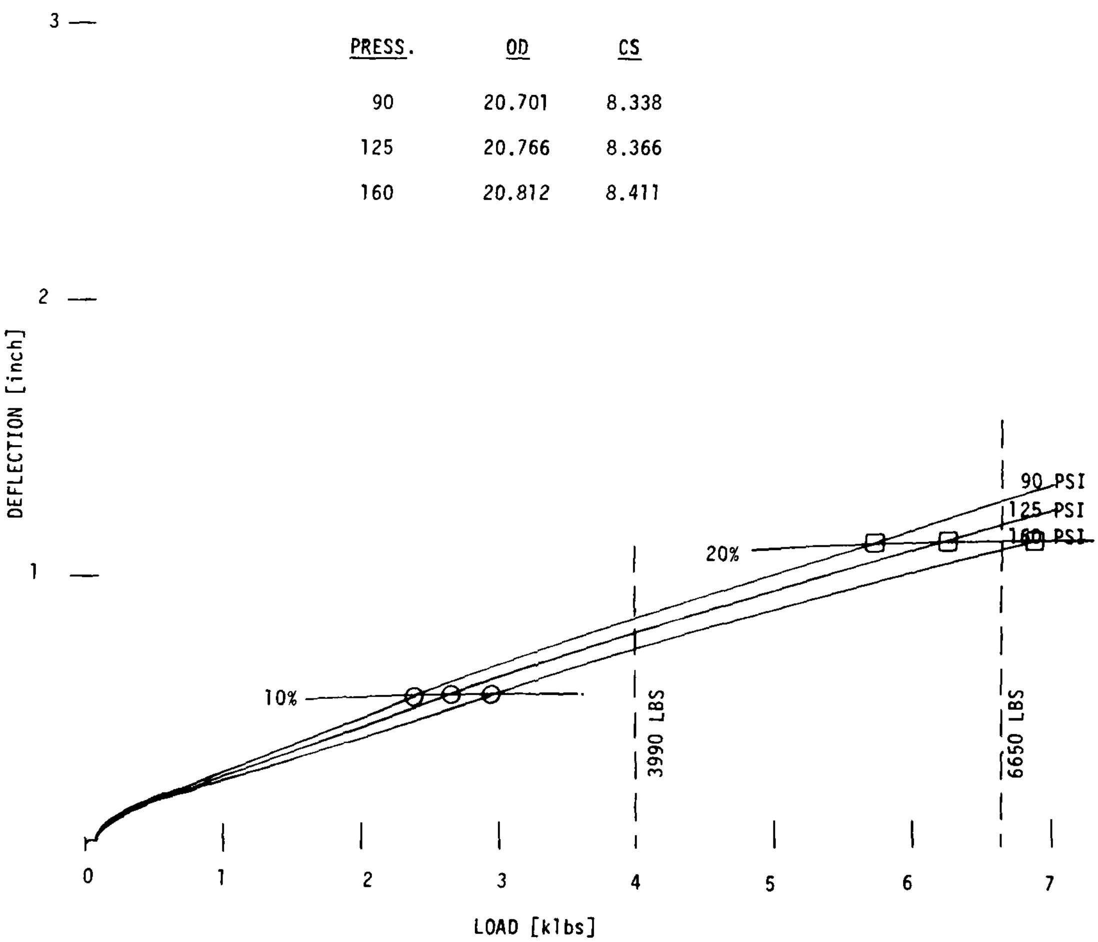

Figure D-31. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B09802

PRESS.	OD	CS
90	20.724	8.361
125	20.778	8.387
160	20.818	8.424

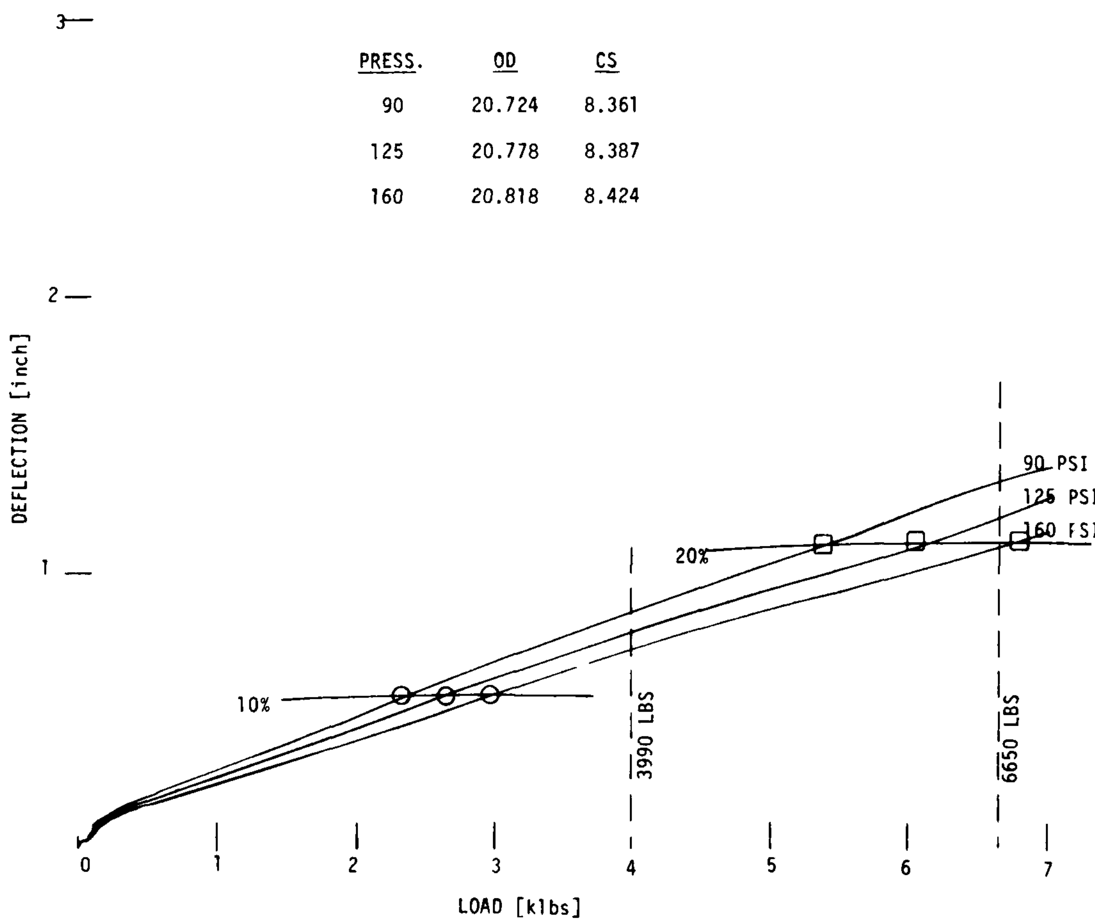

Figure D-32. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B098P2

PRESS.	OD	CS
90	20.980	8.769
125	21.070	8.949
160	21.150	9.157

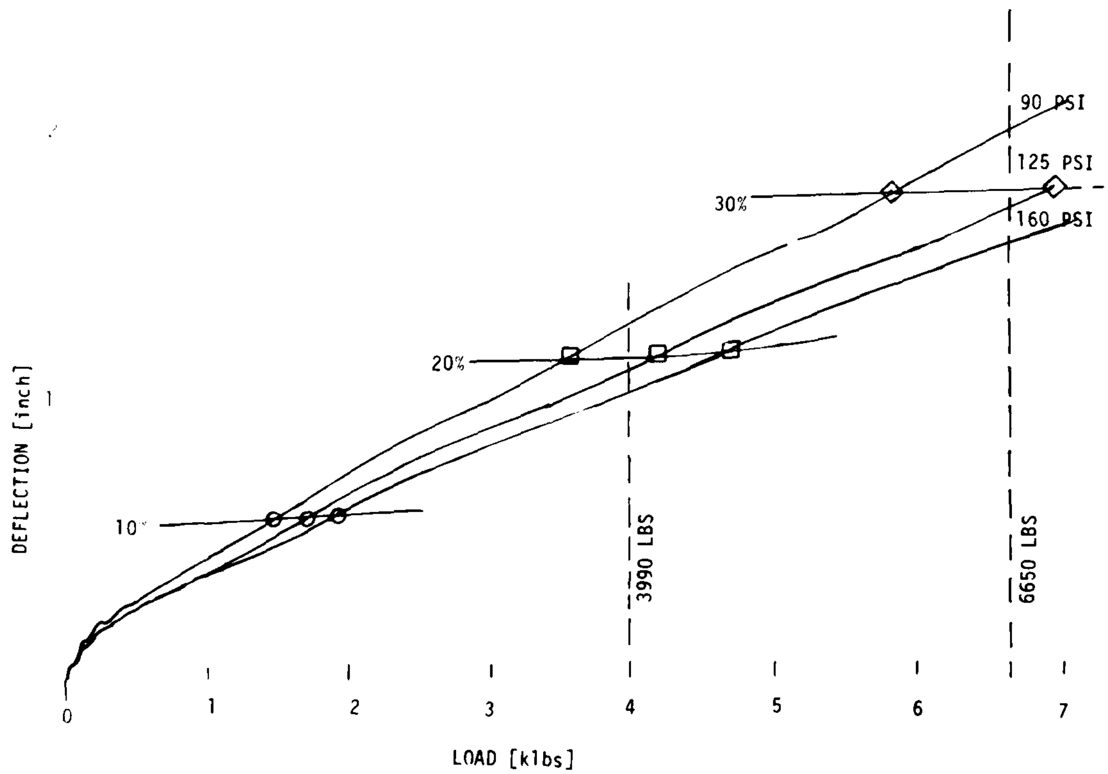

Figure D-33. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B098P2

PRESS.	OD	CS
90	20.920	8.649
125	20.988	8.796
160	21.036	8.981

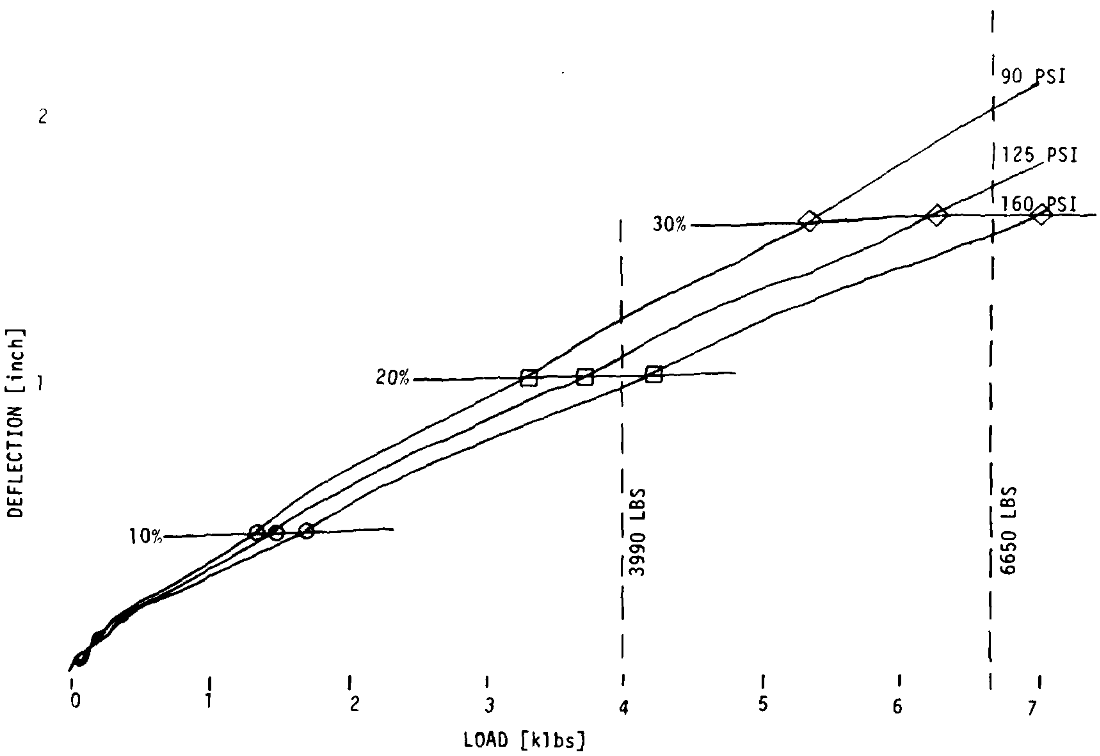

Figure D-34. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B098Q3

PRESS.	OD	CS
90	20.726	8.261
125	20.787	8.301
160	20.820	8.3295

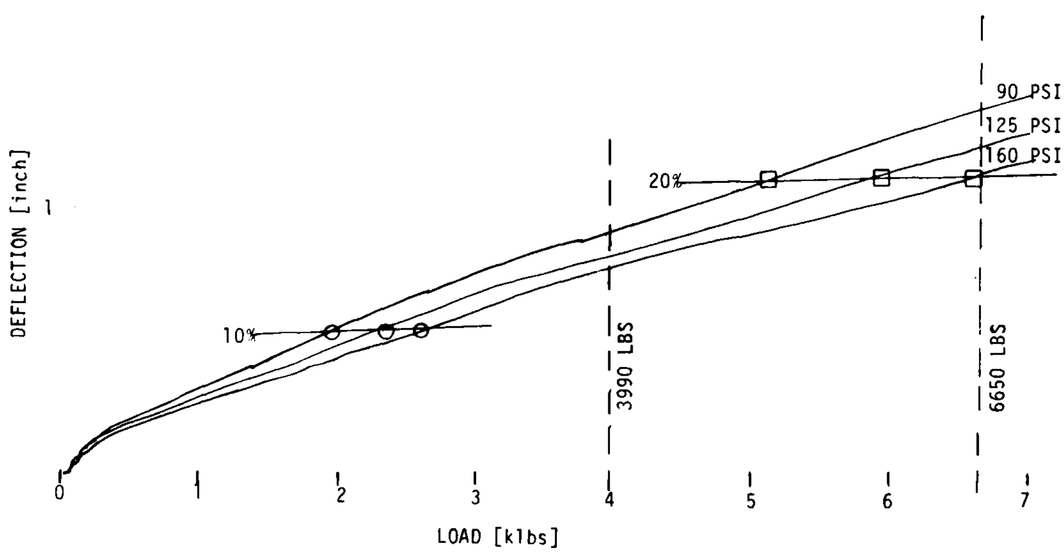

Figure D-35. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B098Q3

PRESS.	OD	CS
90	20.719	8.257
125	20.771	8.275
160	20.812	8.328

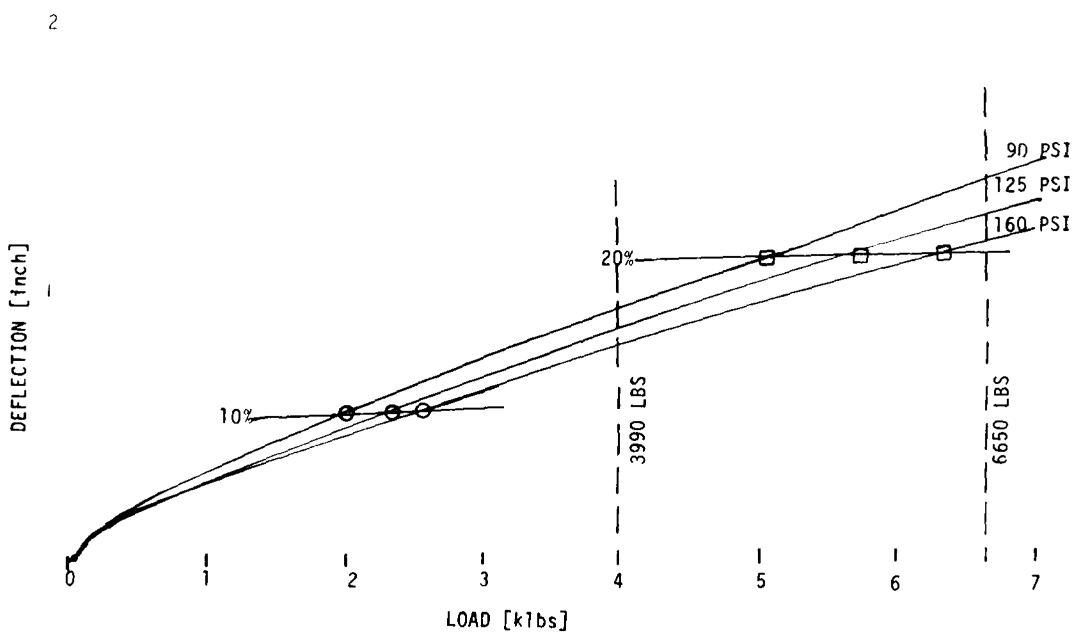

Figure D-36. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B098R2

PRESS.	OD	CS
90	20.934	8.896
125	21.024	9.013
160	21.104	9.252

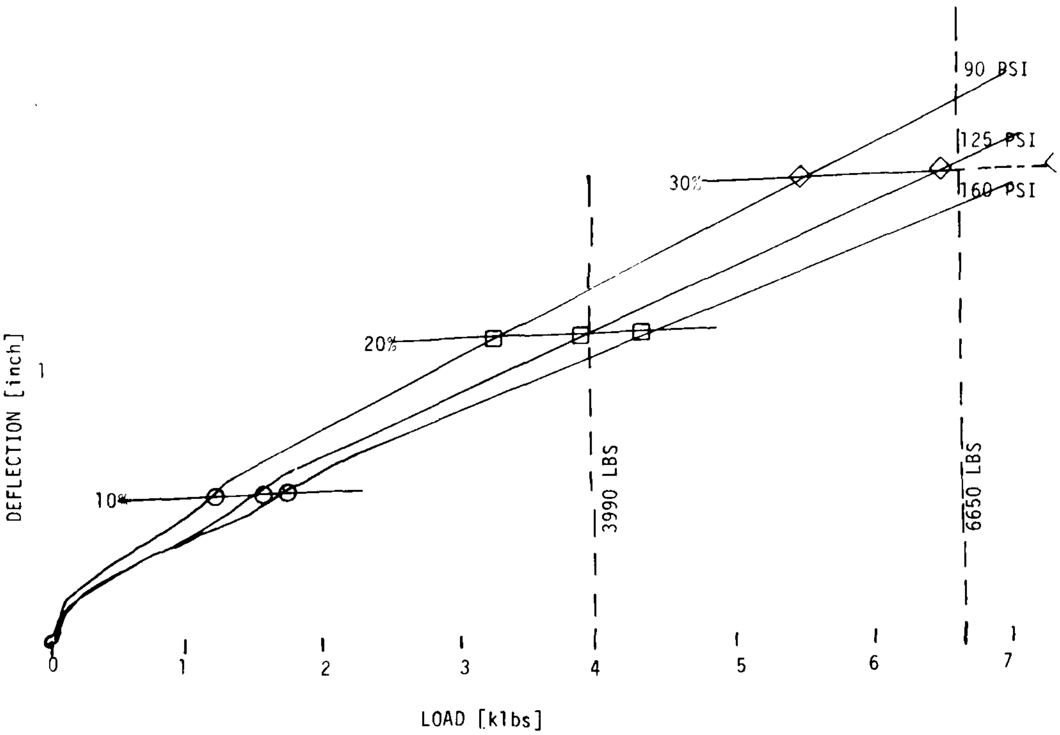

Figure D-37. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B098R2

PRESS.	OD	CS
90	20.914	8.795
125	21.016	9.003
160	21.096	9.196

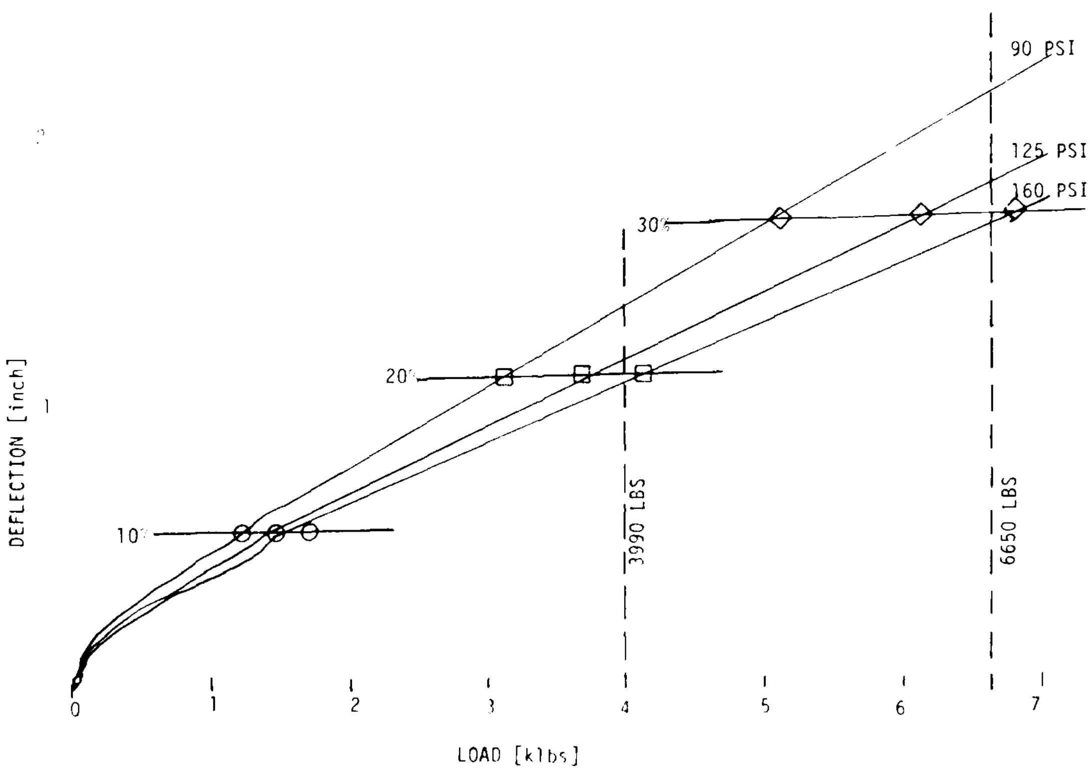

Figure D-38. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B09853

PRESS.	OD	CS
90	20.686	8.204
125	20.762	8.200
160	20.812	8.211

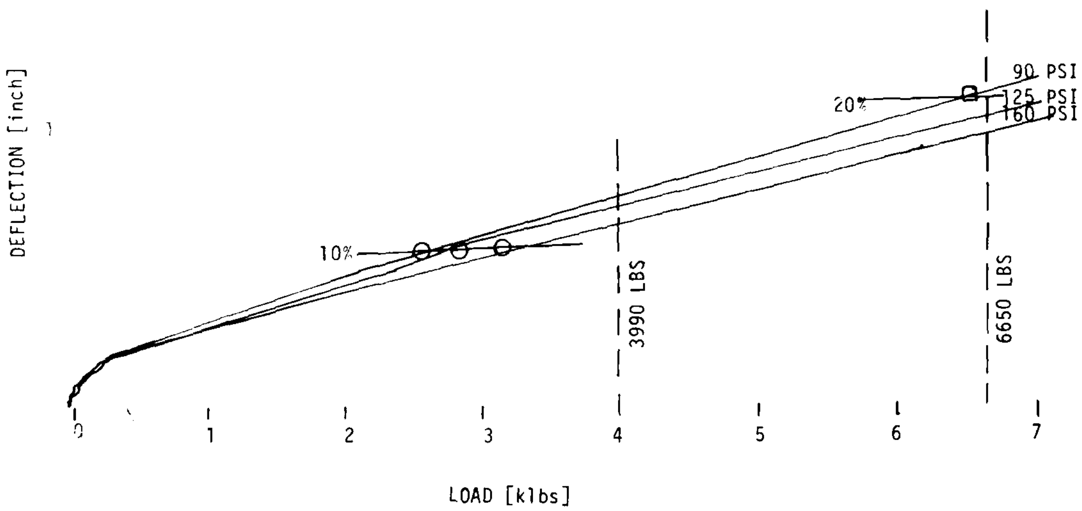

Figure D-39. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B098S3

PRESS.	OD	CS
90	20.674	8.217
125	20.750	8.210
160	20.806	8.214

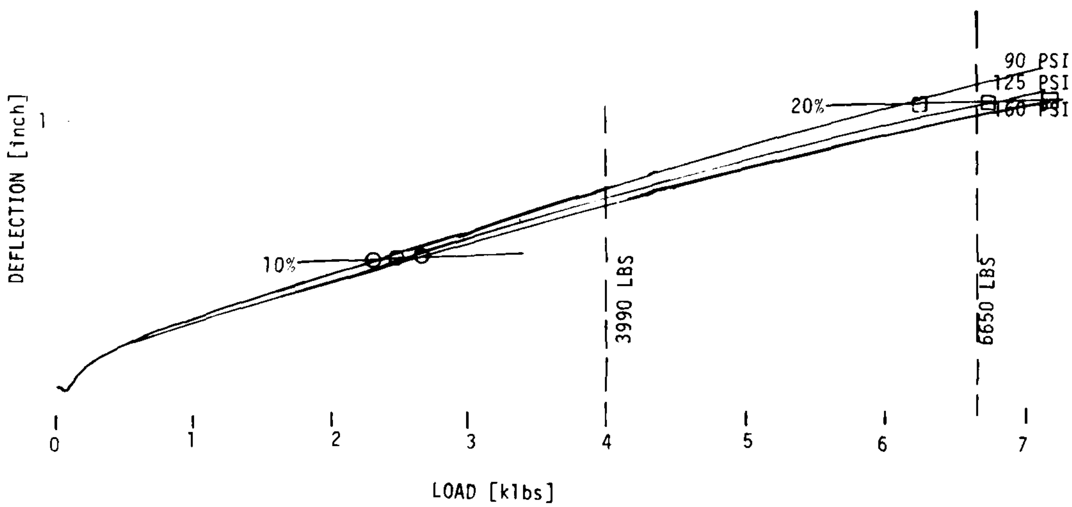

Figure D-40. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B098T2

PRESS.	OD	CS
90	20.778	8.275
125	20.836	8.283
160	20.874	8.298

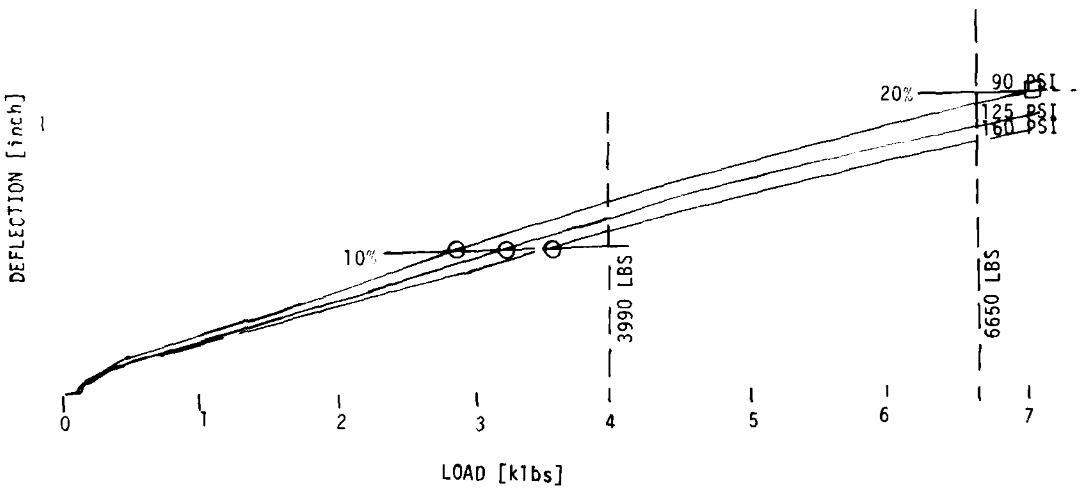

Figure D-41. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B098T2

PRESS.	OD	CS
90	20.768	8.274
125	20.830	8.280
160	20.874	8.295

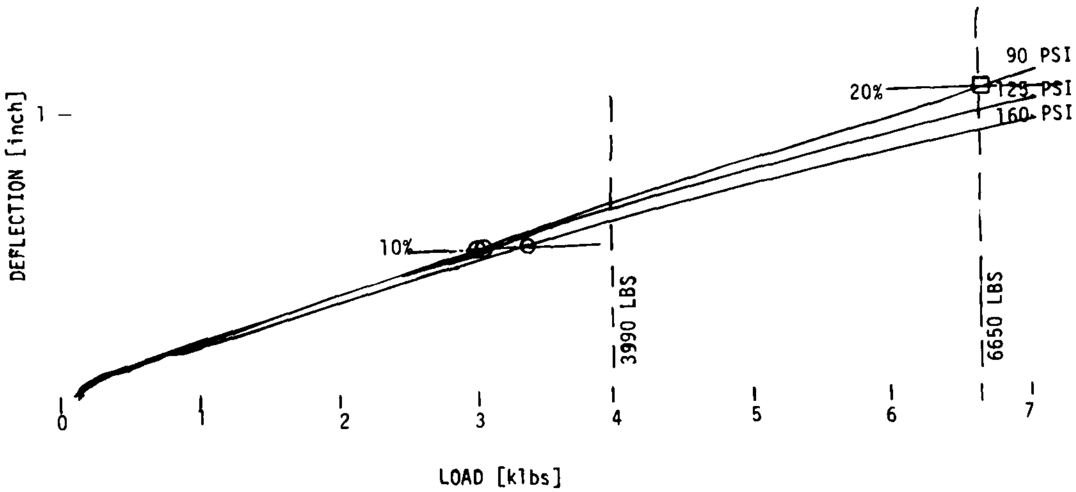

Figure D-42. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B128U3

PRESS.	OD	CS
90	20.848	8.436
125	20.918	8.486
160	20.970	8.543

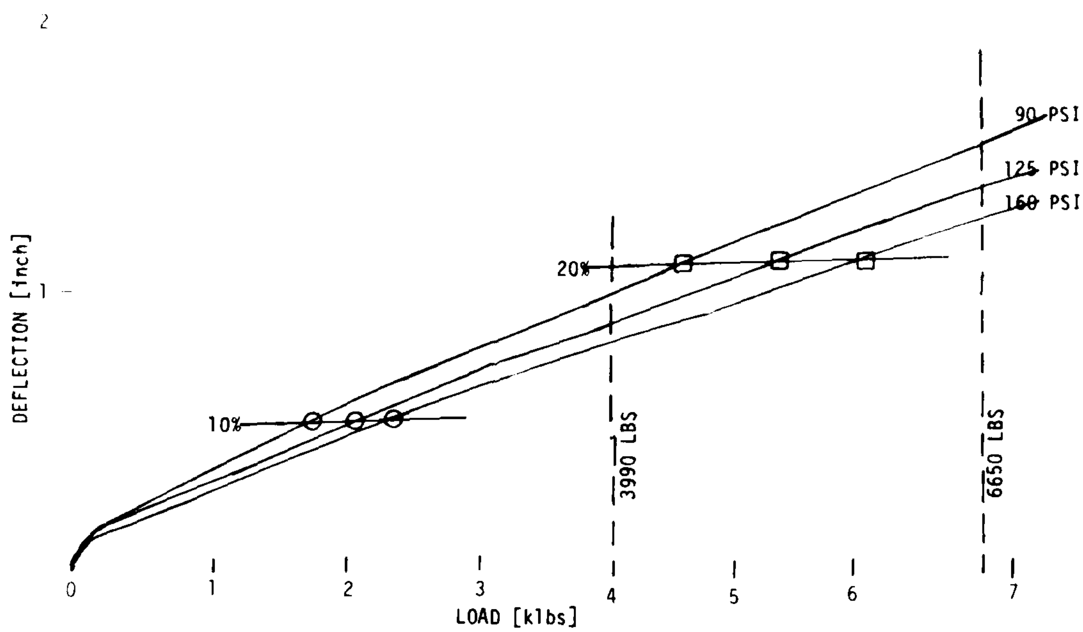

Figure D-43. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B128U3

PRESS.	OD	CS
90	20.874	8.446
125	20.926	8.494
160	20.967	8.549

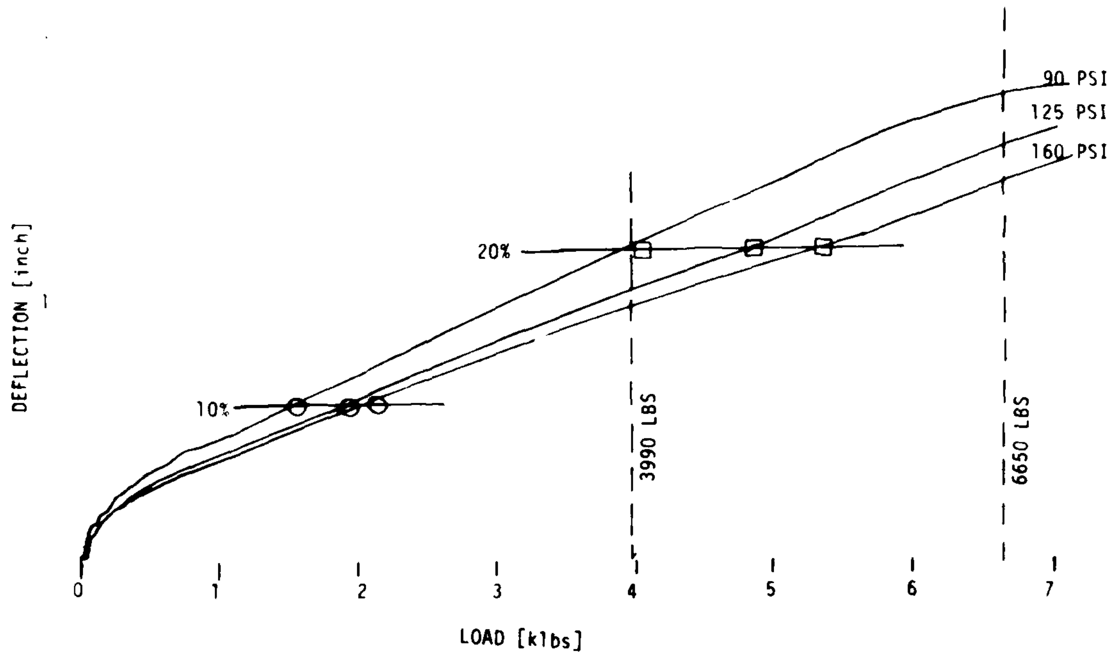

Figure D-44. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B128V3

PRESS.	OD	CS
90	20.932	8.417
125	20.946	8.460
160	21.046	8.506

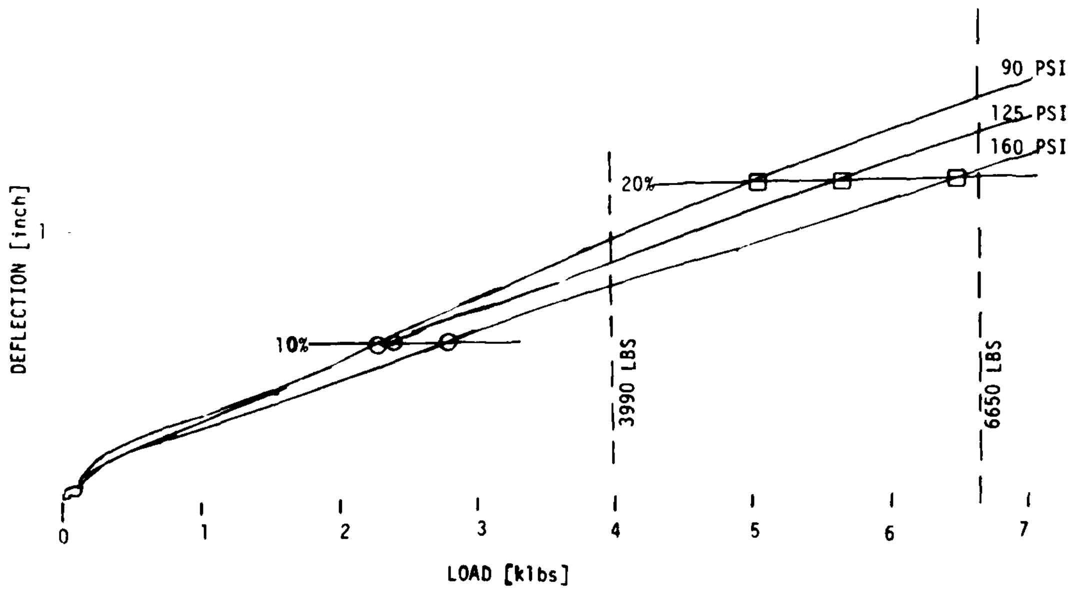

Figure D-45. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B128V3

PRESS.	OD	CS
90	20.942	8.407
125	20.998	8.453
160	21.068	8.491

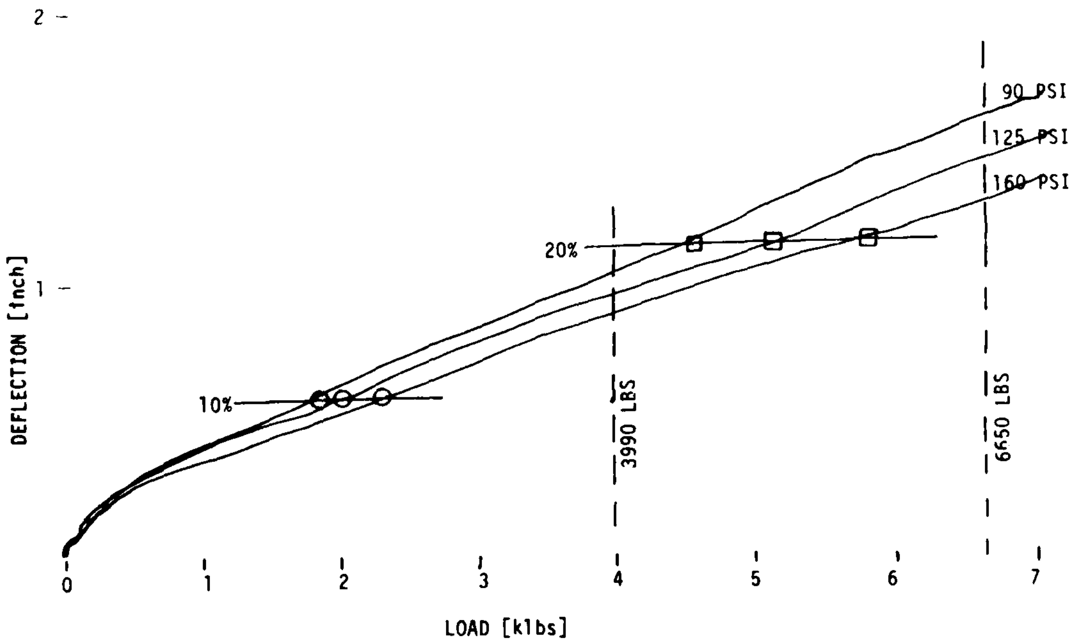

Figure D-46. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B029W3

PRESS.	OD	CS
90	20.788	8.415
125	20.868	8.468
160	20.912	8.529

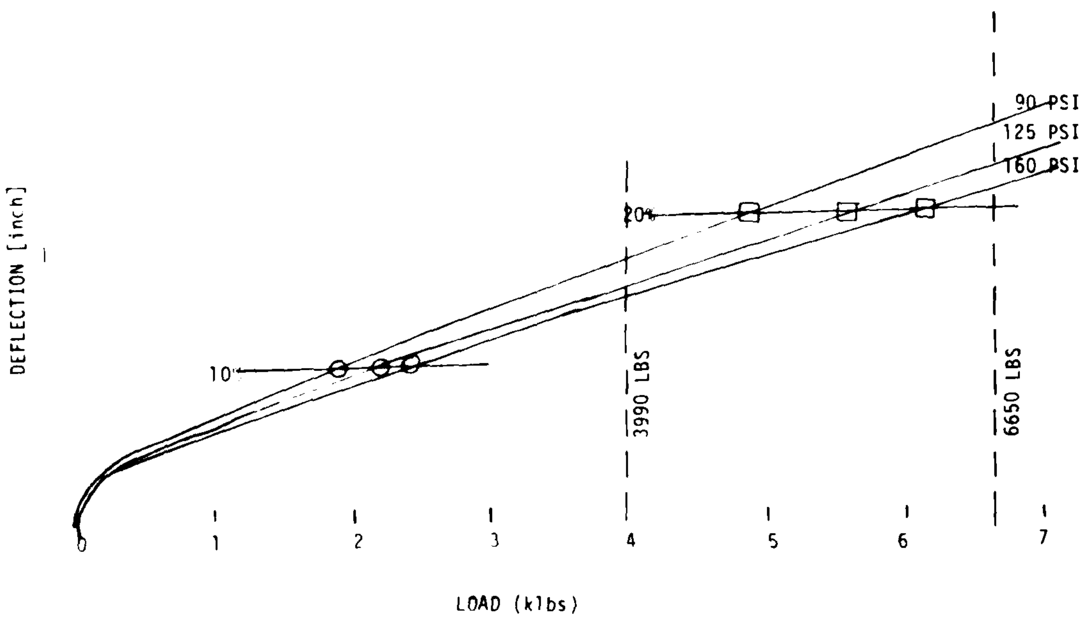

Figure D-47. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B029W3

PRESS.	OD	CS
90	20.790	8.432
125	20.838	8.482
160	20.872	8.537

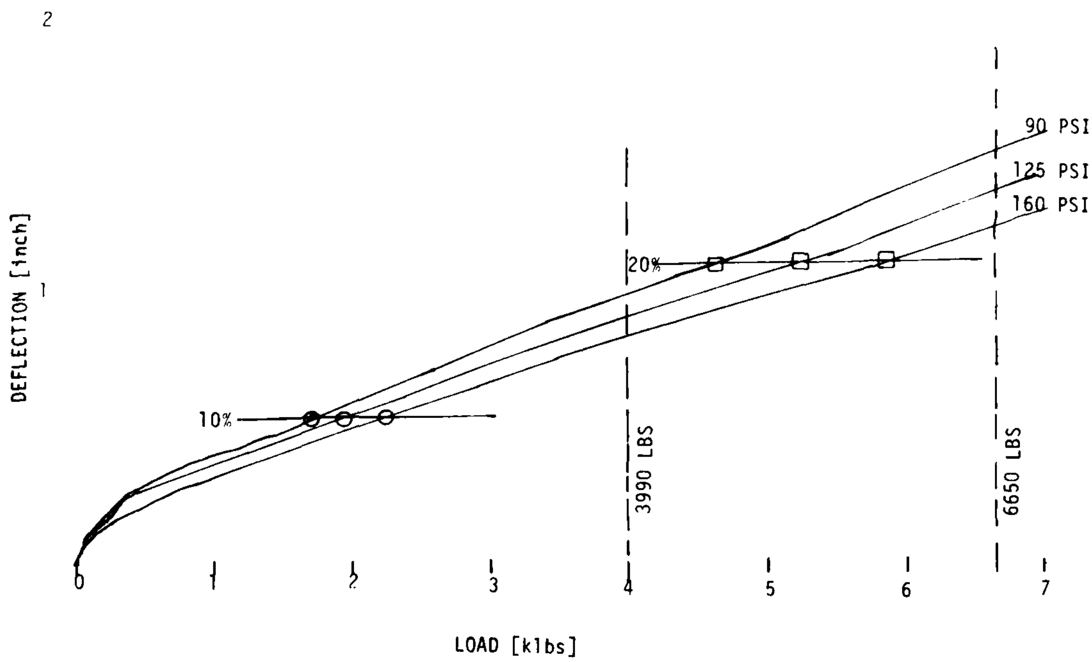

Figure D-48. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B029X3

PRESS.	OD	CS
90	20.800	8.459
125	20.860	8.507
160	20.910	8.570

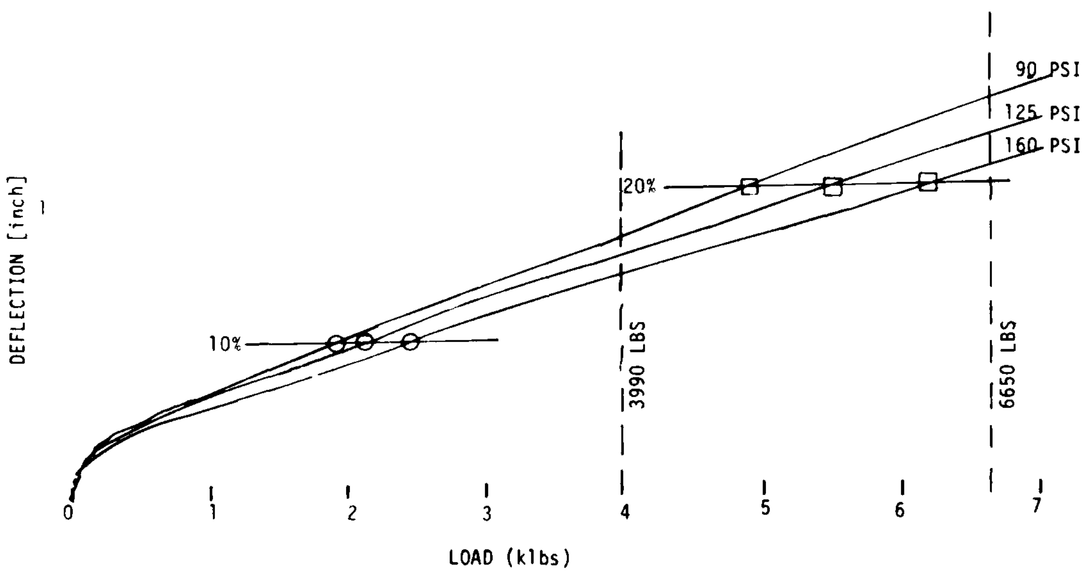

Figure D-49. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B029X3

PRESS.	OD	CS
90	20.812	8.463
125	20.862	8.509
160	20.904	8.564

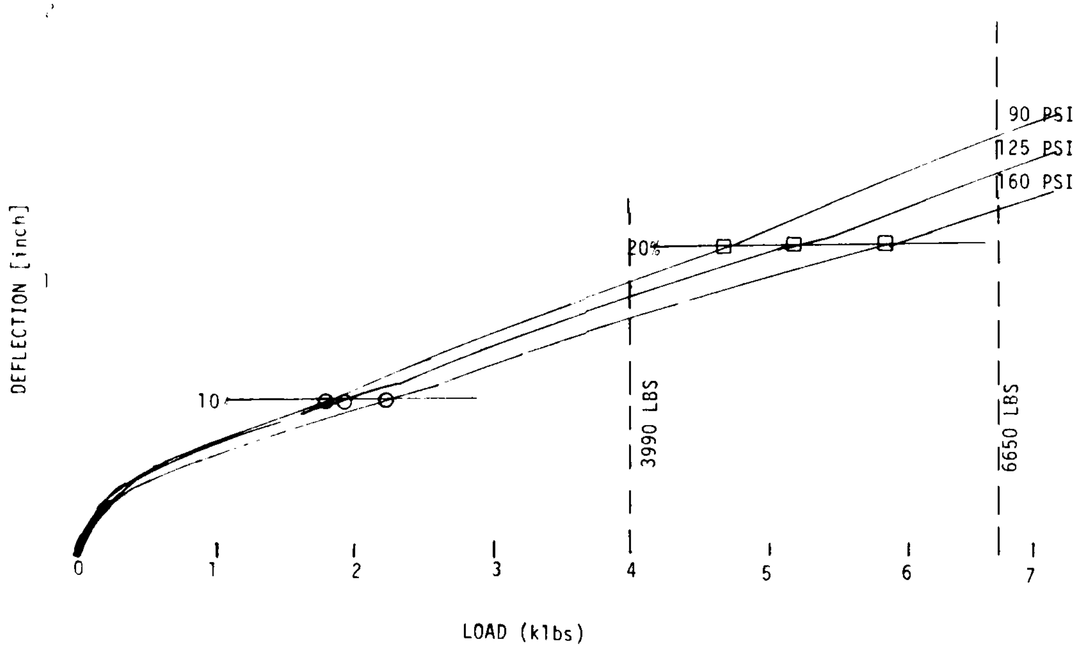

Figure D-50. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B029Y3

PRESS.	OD	CS
90	20.752	8.357
125	20.820	8.394
160	20.858	8.440

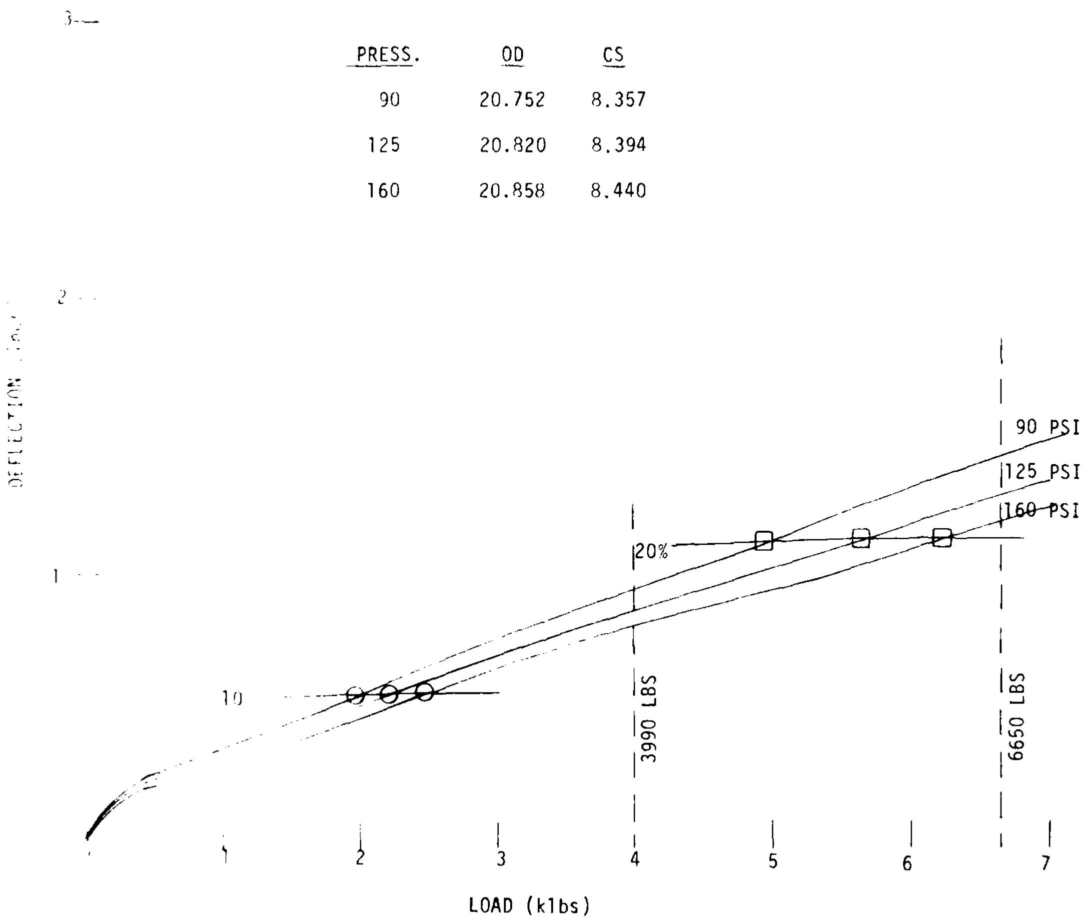

Figure D-51. Deflection Vs Load

CAST TIRE EVALUTION

FLYWHEEL (84" DIA.)

S/N B029Y3

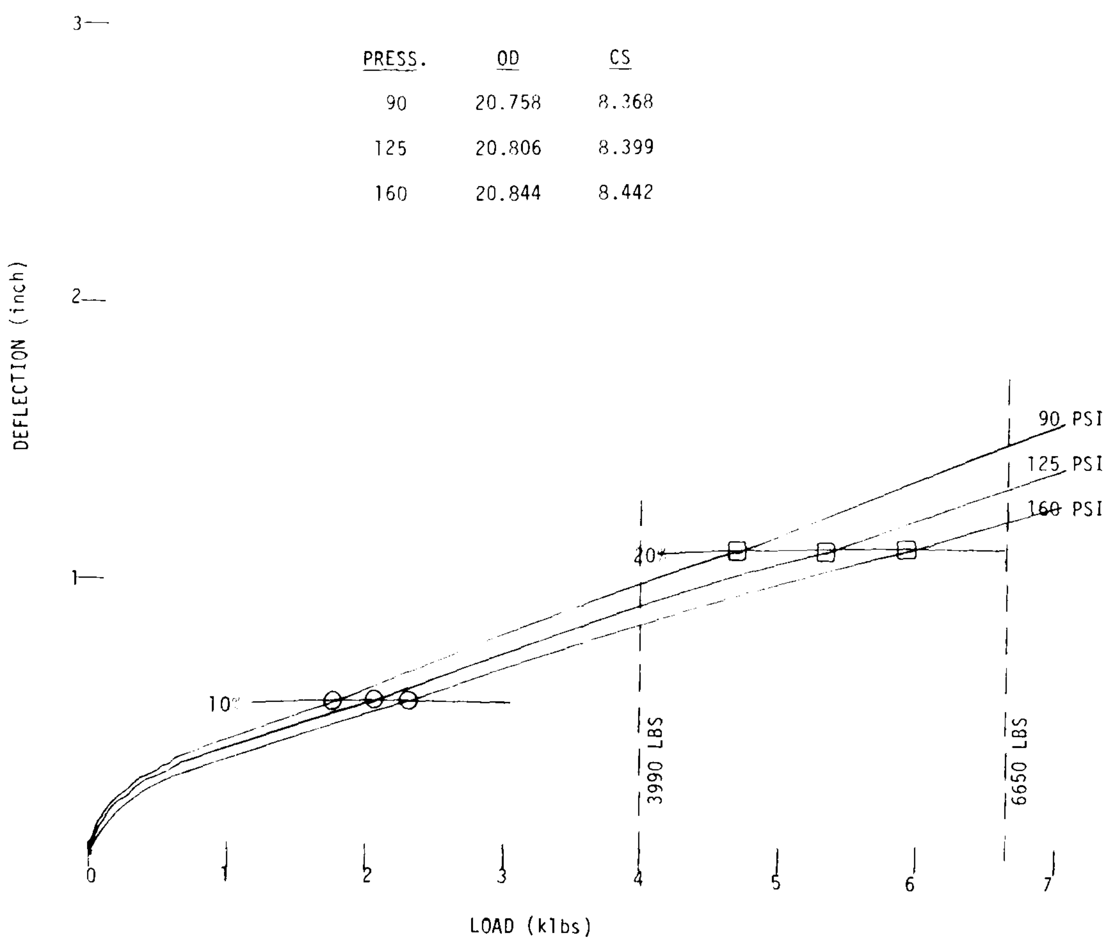

Figure D-52. Deflection Vs Load

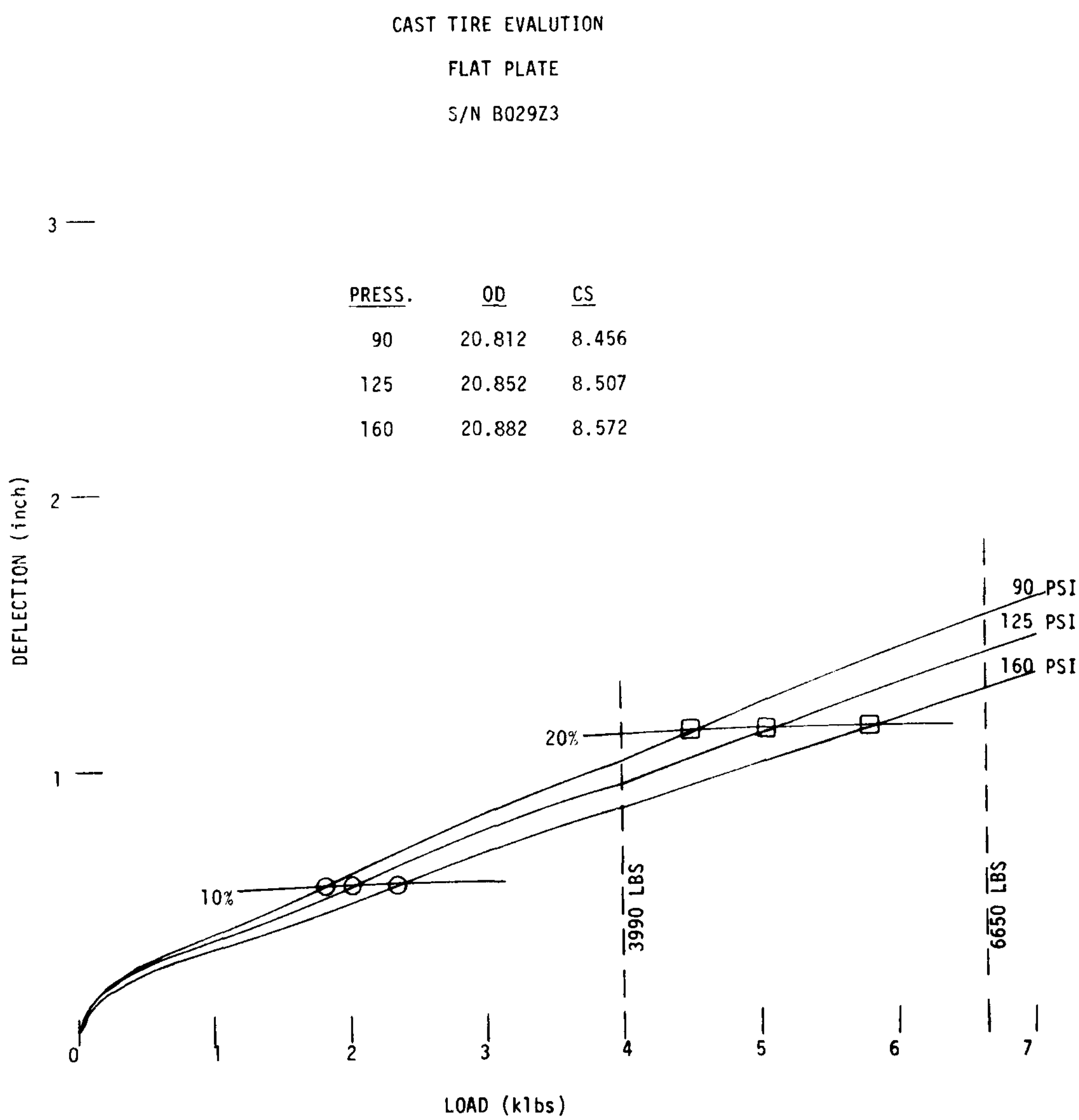

Figure D-53. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B029Z3

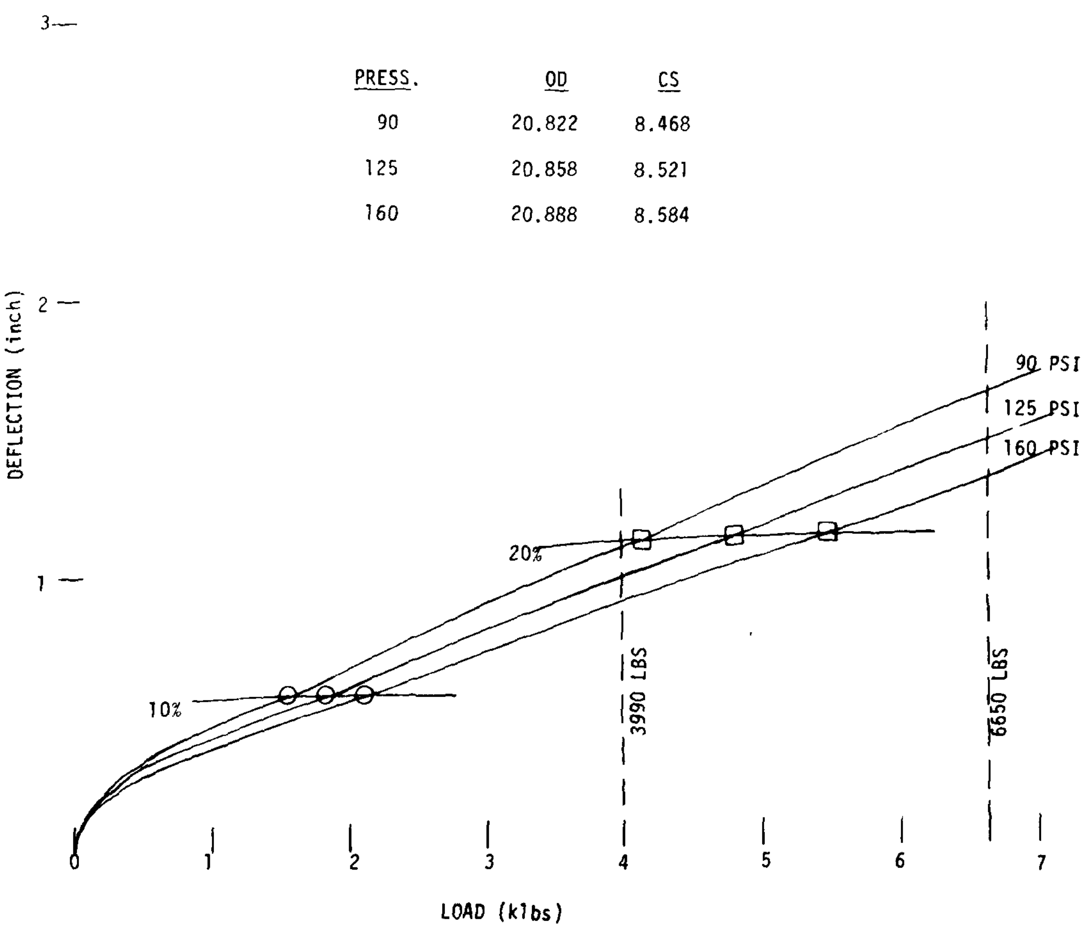

Figure D-54. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B029AA3

PRESS.	OD	CS
90	20.808	8.446
125	20.864	8.498
160	20.906	8.555

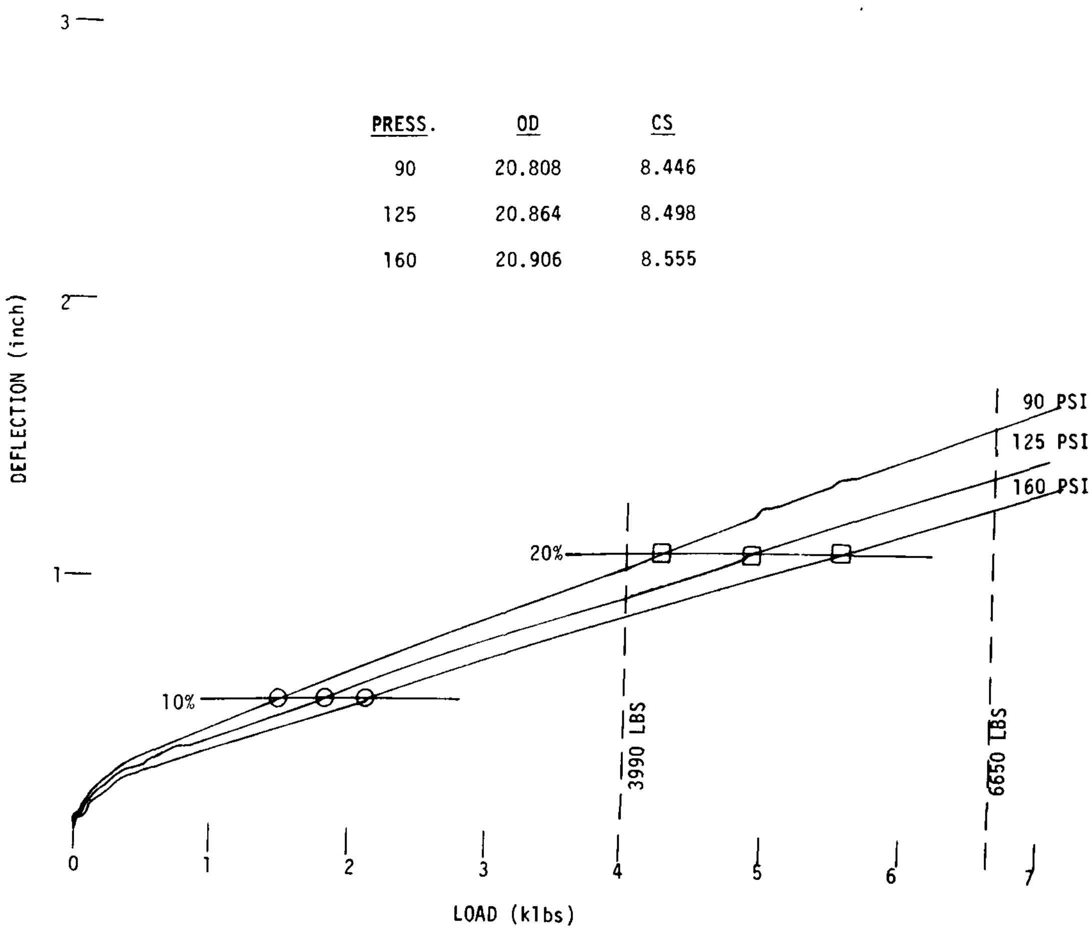

Figure D-55. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B029AA3

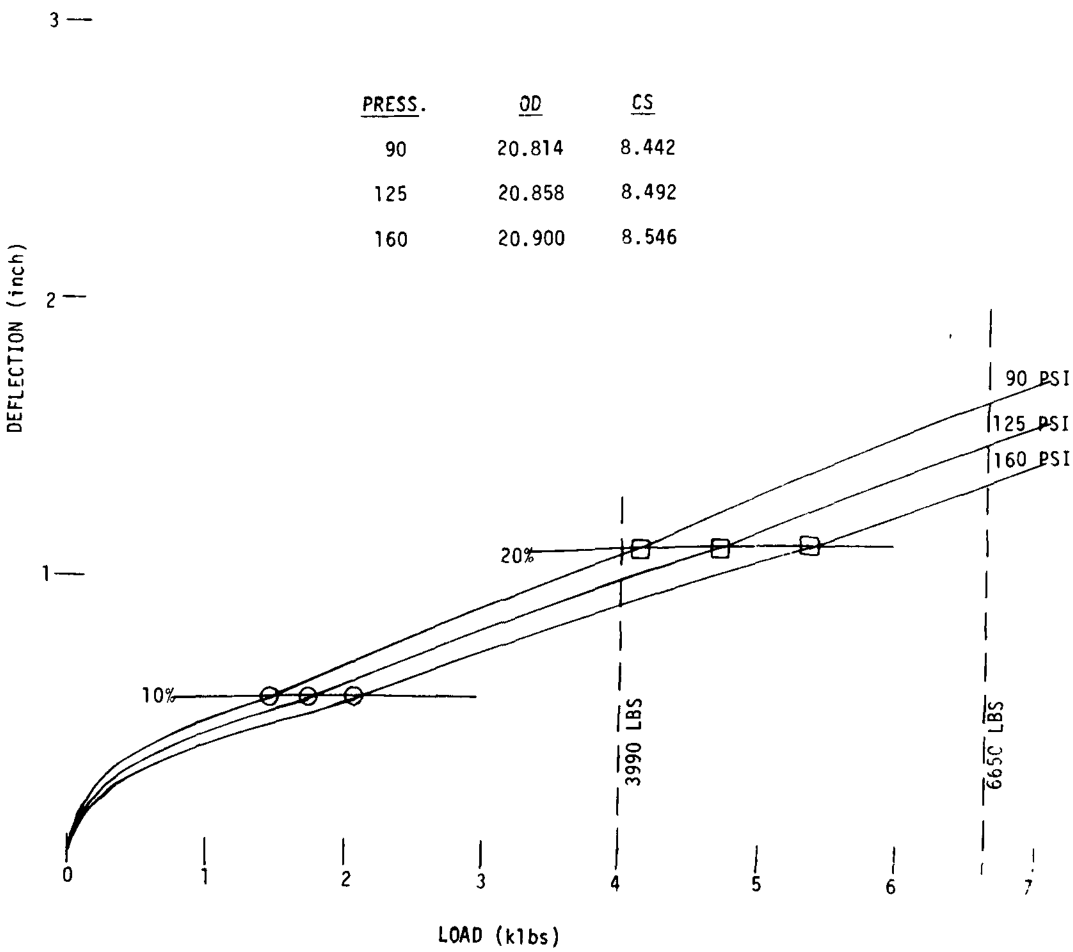

Figure D-56. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B029BB3

PRESS.	OD	CS
90	20.830	8.550
125	20.872	8.631
160	20.894	8.739

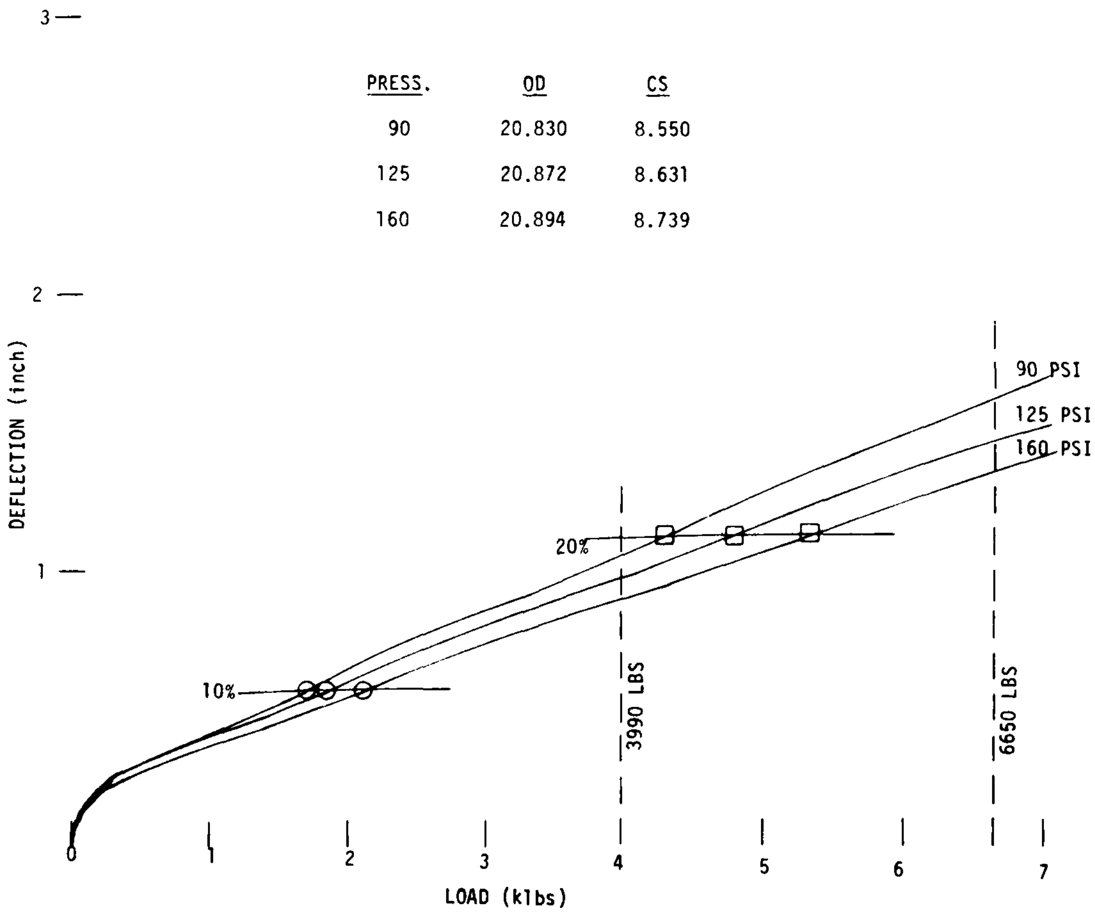

Figure D-57. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B029BB3

PRESS.	OD	CS
90	20.834	8.579
125	20.860	8.662
160	20.884	8.753

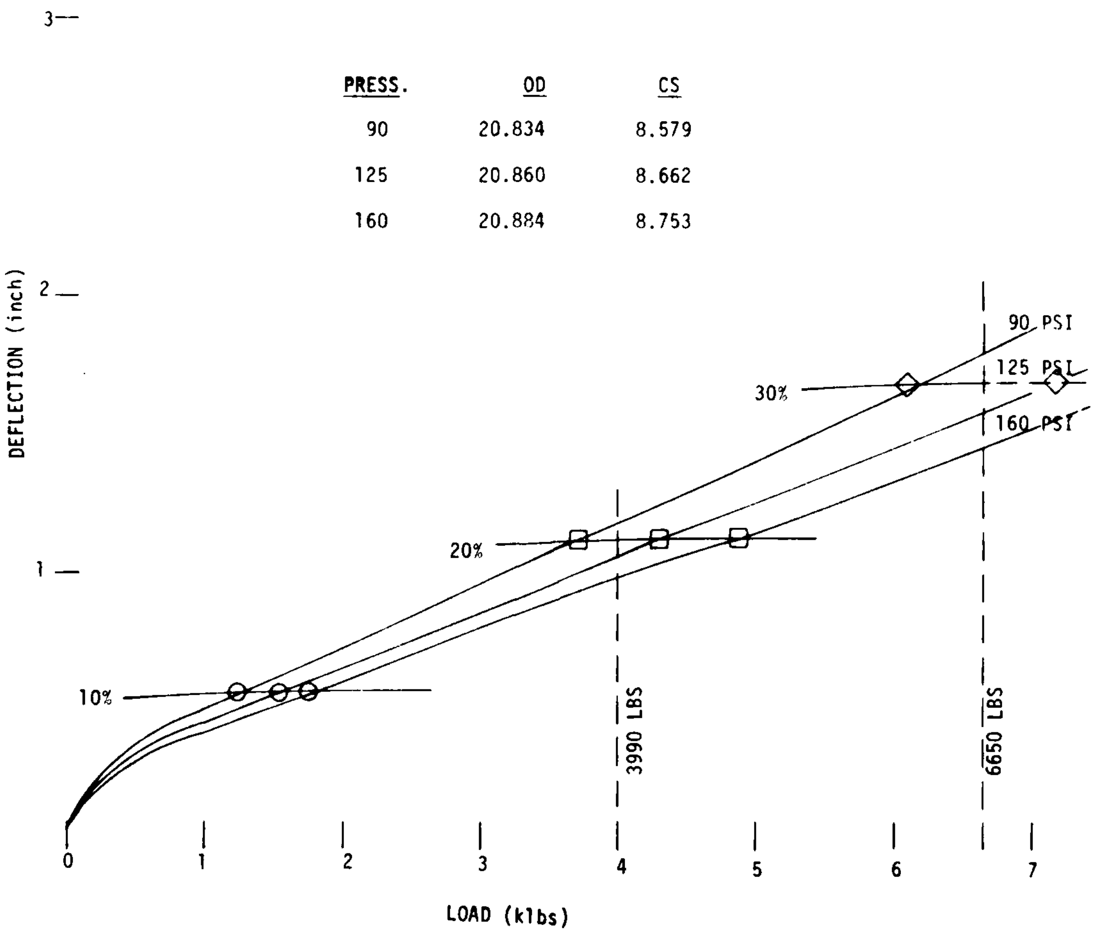

Figure D-58. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B029CC3

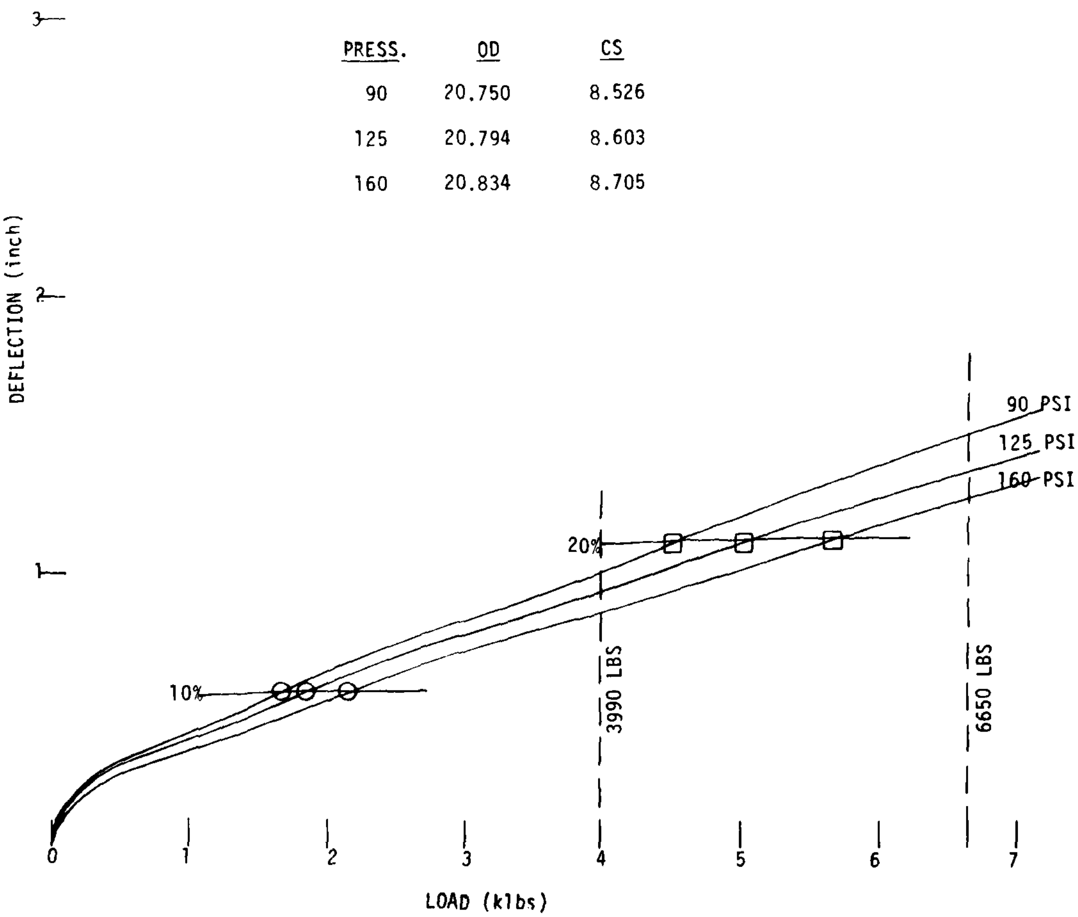

Figure D-59. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B029CC3

PRESS.	OD	CS
90	20.776	8.564
125	20.816	8.643
160	20.848	8.736

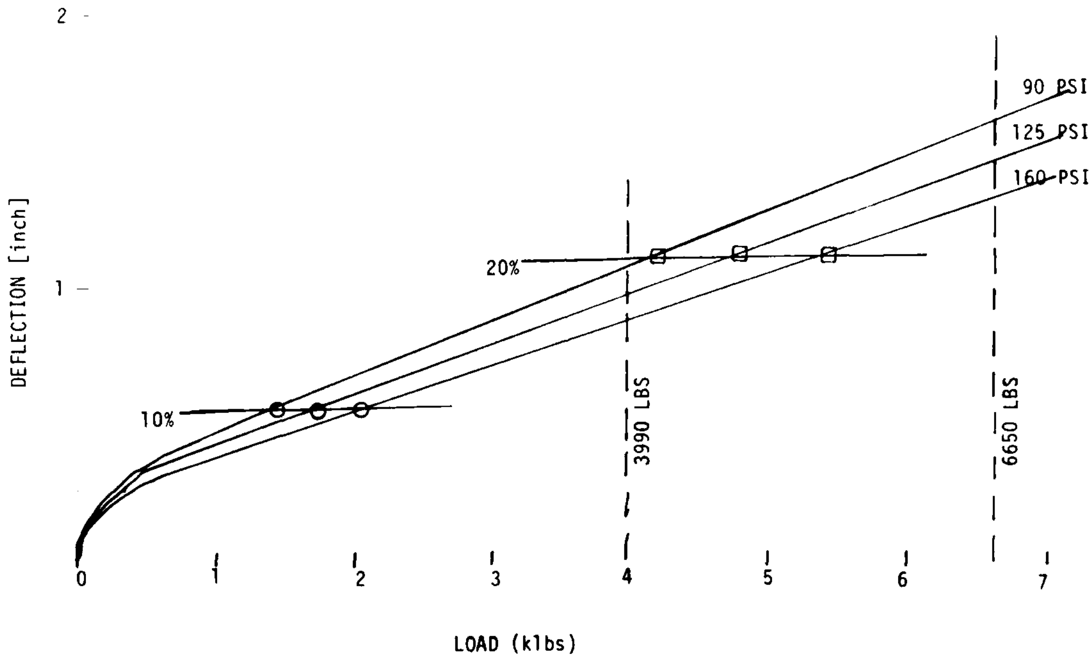

Figure D-60. Deflection Vs Load

CAST TIRE EVALUATION

FLAT PLATE

S/N B029DD3

PRESS.	OD	CS
90	20.784	8.345
125	20.842	8.399
160	20.872	8.471

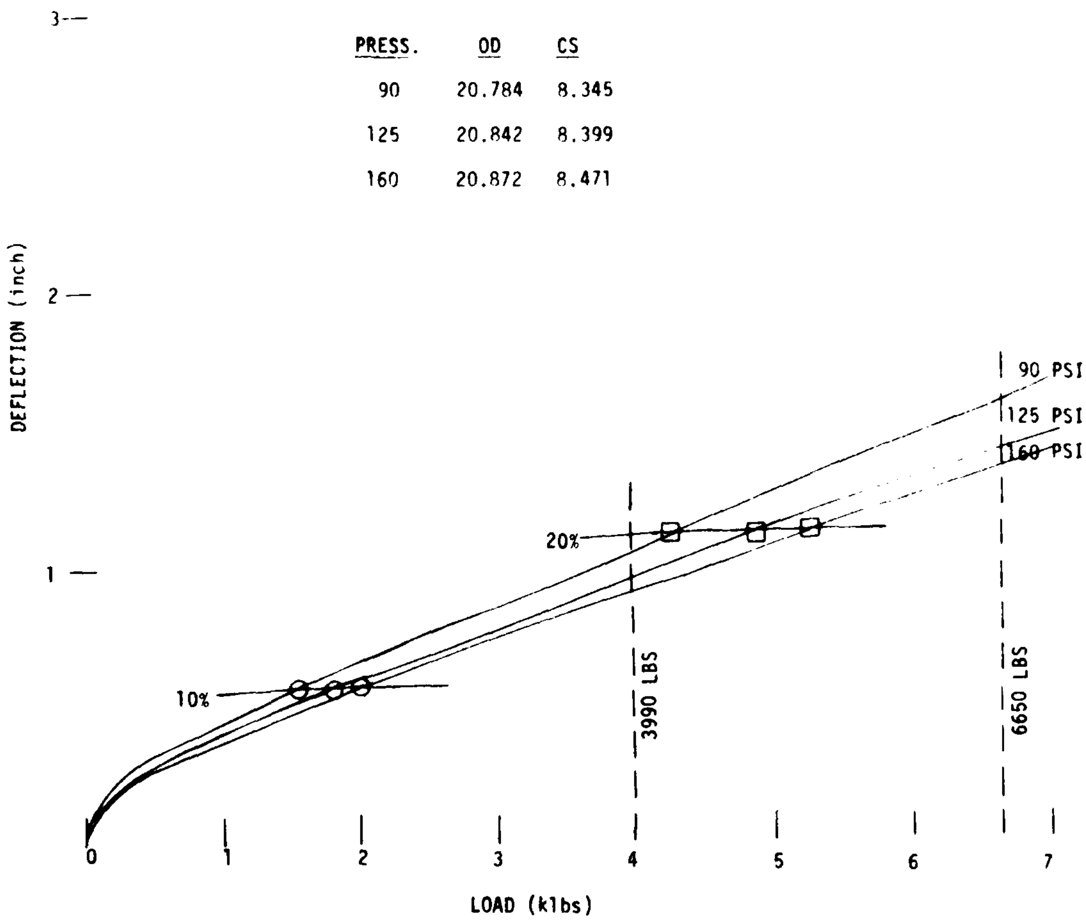

Figure D-61. Deflection Vs Load

CAST TIRE EVALUATION

FLYWHEEL (84" DIA.)

S/N B029DD3

PRESS.	OD	CS
90	20.792	8.374
125	20.870	8.427
160	20.910	8.489

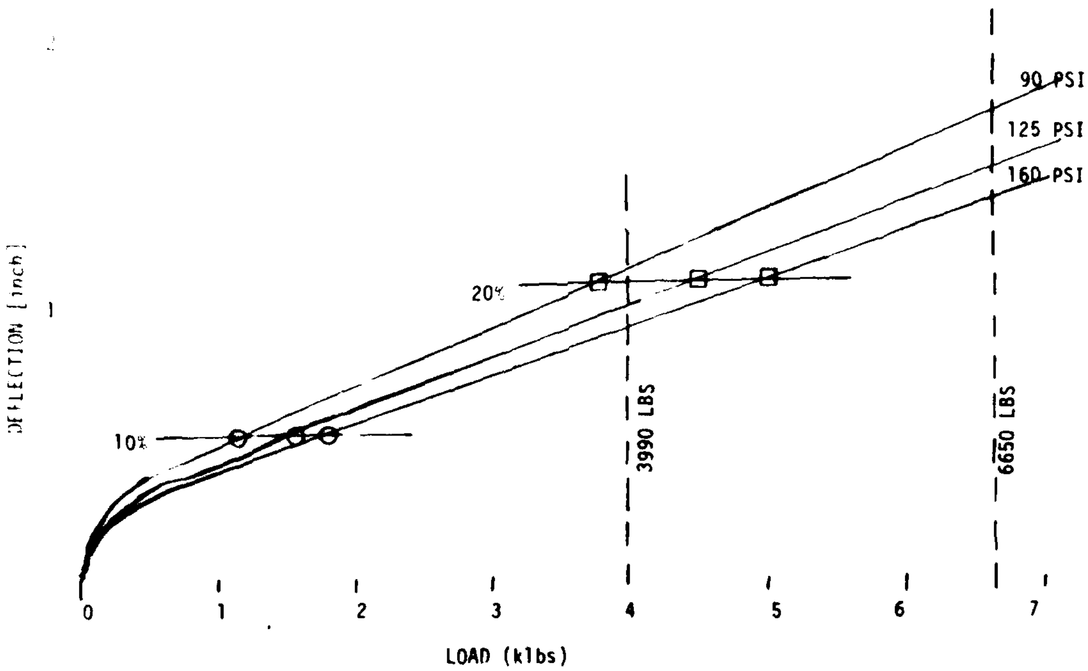

Figure D-62. Deflection Vs Load

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